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27

# PUBLIC WORKS

CITY COUNTY STATE

PAVING PLANT SERVED BY INDUSTRIAL TRACK DELIVERING BATCH BOXES AT COLCHESTER ON 22½ MILES OF NEW LONDON TURNPIKE IN 1921. DESCRIPTION WILL APPEAR IN THE JANUARY 14TH ISSUE.

IN THIS ISSUE

Soil and Water Pollution

Pennsylvania Policies as to Public Sewerage

Hydraulic Fill Dam Core Severely Tested

Testing and Inspecting Concrete

Horicon-Beaver Dam Road

Concrete Pavement Construction

DECEMBER 31, 1921

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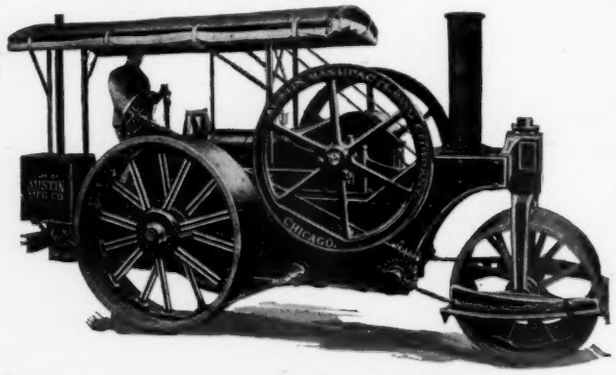

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VOL. 51. No. 27
Entered as second-class matter at the Post Office, at New York, N. Y., November 22, 1921 under the Act of March 3, 1879.
Published weekly by PUBLIC WORKS JOURNAL CORPORATION, 243 W. 39 th St., New York, N. Y.
Subscription price $3.00 a year, single copies 10 cents.

# PUBLIC WORKS.

CITY COUNTY STATE

A Combination of "MUNICIPAL JOURNAL" and "CONTRACTING"

Vol. 51 DECEMBER 31, 1921 No. 27


# Soil and Water Pollution

**Area over which pollution may spread and carry germs of intestinal diseases, as indicated by experiments of Rockefeller institute, U. S. Public Health Service and others. Type of soil and depth of water table important factors.**


**By W. A. Hardenbergh***


The question of the area over which dangerous pollution may spread from some focal point, as a pit or open privy, or broken sewer, has long been the subject of discussion and interest. Likewise it is an important matter from the viewpoint of health, and its importance is growing with the increasing density of population. The determination of the danger area is most important in the matter of rural water supplies, and in the selection of types of privies and of sewage treatment plants in all areas where the water supply is from wells, springs, or similar sources.

Two factors must be considered—surface pollution and sub-surface pollution. At first glance the former may seem to lack the importance of the latter; but it is safe to say that a large part of the disease caused by bad wells and springs is due to surface pollution, under which head falls the carriage of pollution by water over the ground surface, and by wind, animals, or other forms of mechanical transportation. Sanitary surroundings and common sense care are the preventives for this sort of pollution.

Sub-surface pollution has the stronger appeal to the imagination. Largely because of the uncertainty and lack of knowledge regarding it, it has often been convenient to attribute to sub-surface contamination many cases of disease which might as easily have come from other sources.

But it must not be concluded that underground travel of pathogenic bacteria is the exception to the rule, and that such sources of disease are unimportant. Experiments have shown that dangerous pollution often travels for considerable distances with underground waters. The possibility of disease spread is always present where there are chances for ground water pollution.


*Sanitary engineer for County Board of Health, Jefferson County, Alabama.


The chance of such disease spread depends to a large extent upon the life of pathogenic bacteria under the conditions they will encounter in septic tanks, underneath the ground surface, in privy pits, etc. Many experiments have been conducted along this line. Typhoid and dysentery bacilli are usually considered to have a life in septic tanks of not more than five days; in soil they will live for much longer periods, even two or three months if the conditions are favorable; in masses of feces, as in privies, the life will rarely exceed two or three weeks.

However, present-day sanitary technique considers as a dangerous indication the presence of B. Coli, and we must therefore hold as dangerous the appearance of B. Coli, irrespective of whether or not the above conditions as to the life of typhoid and dysentery bacilli have been met.

During the past few years the movement toward sanitation has intensified the interest in the possibilities of pollution from privies, septic tanks and leaky sewers, and research has been carried on by several bodies with the purpose of determining the limit of travel of such pollution.

The Public Health Service, through an experimental board headed by Dr. Charles Wardell Stiles, has been making a most complete and far-reaching investigation into this subject. There is no doubt that the results that will be secured from the work of this board will be of the greatest importance, but as yet no definite conclusions are ready for publication, and it is the desire of the Board just now to make no statement. However, it can be said that it has been found that under certain conditions, pollution may travel for considerable distances with ground water; but the distance of travel through soil not impregnated with water is generally limited.

Perhaps one of the most thorough investigations so far made is that recently concluded by Dr. Isreal

J. Kligler of the Rockefeller Institute. The report on the work, which has just been published by the Institute, has been summarized by the Alabama State Board of Health as follows:

The problem was approached from both the experimental and the practical standpoint. In the laboratory repeated tests were made to determine (1) the viability of the typhoid and dysentery bacilli in soil and in excrement under different conditions; (2) their ability to penetrate through columns of soil of different porosity; (3) their viability in septic fluids and effluents; (4) the nature of antagonistic factors in soil and septic material which influence the viability of these microbes. In the field work various types of privies of different ages were examined, particularly with regard to (1) the extent of pollution of soil surrounding these privies; (2) their relation to well pollution; (3) the passage of material through the soil from privies to adjoining wells.

The main conclusion arrived at on the basis of both the experimental and field observation was that in moderately compact clay and sand-clay, or sandy soil, free from cracks, the possibility of sub-soil pollution of the ground water is negligible, provided the ground water level is more than ten feet below the polluted area.

The exeprience of the writer agrees almost exactly with this conclusion, except that he would add the qualifying statement that the ten feet of soil below the polluted area is a safeguard only if there is no excess of water to carry the bacteria rapidly through the soil. In other words, he does not consider a pit privy entirely safe with only 10 feet between its bottom and ground water unless it is so constructed as to prevent the entrance of large quantities of water, which may pass rapidly through the lighter soils, in many cases carrying pollution to the water below.

The summary above mentioned goes on to state that the following facts were established:

1. The typhoid and dysentery bacilli succumb rapidly on exposure to an unnatural environment.

(a) Both typhoid and dysentery bacilli die out in one to five days in septic tanks.

(b) In solid feces the typhoid bacilli may survive for a period of 10 to 15 days, while the dysentery bacilli rarely survive longer than five days. The paratyphoid bacilli are the most resistant members of the group; the Shiga dysentery bacillus is the least resistant.

(c) The survival period of these organisms in soil is greater than in either feces or septic fluids, and varies particularly with the moisture and the reaction of the soil. Temperature does have some effect on the viability, but the two main factors are moisture and reaction. In moist natural soil, the typhoid and dysentery bacilli may be recovered up to 70 days. In the same soil, dry, the bacilli are not recovered after two weeks. In moist acid soil, 90 per cent of the inoculated bacilli die within the first 10 days, but the others may survive as long as 30 days.

(d) The antagonistic action of soil bacteria on typhoid and dysentery bacilli is due largely to the alkaline reaction resulting from their metabolism. Specific inhibitive substances are, however, elaborated by some soil bacteria, notably B. Fluorescens and B. Proteus.

2. The spread of pollution from a focal point is limited in scope.

(a) Typhoid and dysentery bacilli under experimental conditions were not observed to spread laterally to any appreciable extent, although they were carried vertically through a column of two feet of porous soil. In denser soil they failed to penetrate through one foot of soil.

(b) In the field where subsoil was free from pollution either near pit privies or near tile pipes from septic tanks, contamination extended downward to a depth of 3 to 5 feet, and laterally only about two feet.

(c) Heavy rains or constant dripping of water may carry surface pollution to a depth of ten feet.

3. Pollution of wells is usually surface in origin.

(a) There was no correlation between the type or proximity of the privy to the degree of contamination of the adjacent wells. The purity of the well water varied rather with the condition of the well. Driven shallow wells with pumps were, as a rule, free from contamination, while dug wells with pumps or buckets were more or less grossly polluted.

(b) Experiments with fluorescin failed to show subsoil pollution of wells from privies, but proved in some instances at least the possibility of surface contamination.

The summary also refers to a report made by P. A. A. F. Eyken and G. Grijns concerning similar investigations in the tropics. In general the results are very similar. It was found that pollution of the subsoil around pits was very slight. In only one case was it possible to trace pollution as much as 5 meters from the pit. In dry soil, B. Coli were not found at a depth greater than 20 inches; in wet weather the penetration was about three times as great. In the case of high ground water, these authorities seem to think that much pollution is from the soil directly into the ground water and thence to the nearby well, with the privy having no place in the process. This would appear to fall under the head of surface pollution, and illustrates how mechanical (or animal transportation of pollution may be a factor in the spread of disease.

C. L.L Pfau, of the Public Health Service, made some tests in 1919 around various sanitary privy installations in Kentucky. He found that pollution from the effluent pipes of septic closets extended two or three feet on each side of and about ten feet below the point of discharge. Therefore, in case ground water is within ten feet of the point ot pollution, contamination may occur. No figures are given for distance of travel of pollutuion with ground water.

The report of the Commission on Additional Water Supply for New York City, made by Burr, Hering and Freeman, records some experiments by Whipple on this same subject, the tests being made at Elmont, L. I. While it is stated that the passage of polluted water, at low velocities, through 25 feet of the finer sands, such as are found in Long Island, will render the water safe to use and that, in most cases, a lesser distance would be considered safe, it is shown that under severe conditions sewage bacteria and B. Coli may pass through soil for a considerable distance.

In these tests a circle of wells was sunk around each of two latrines at a distance of ten feet, with a test well for each latrine 50 feet away. The latrines were six feet deep. The water table was 13½ feet below ground surface. The wells were so placed as to take ground water at 2 feet, 7 feet and 17 feet respectively below the top of the water table.

Samples collected from these wells at intervals showed all the water heavily polluted. The nitrogens were high, esepcially those in the form of free ammonia and nitrates, indicating active decomposition. The bacterial counts also were high, some of the samples containing numbers comparable to those found in sewage. The effect of rainfall on the number of bacteria was great. B. Coli was not present as often as might have been expected. Out of 110 samples of water tested, only 1.8% showed positive B. Coli in 0.10 c.c.; 9.1% with 1 c.c.; and 22.7% with 10 c.c. Five other wells driven at distances of 130

to 220 feet showed indications of active decomposition of organic matter, and two of them gave some positive tests for B. Coli in 10 c.c. samples.

However, when the fact is considered that the bottom of the pit was but 7½ feet above ground water, and the wells but ten feet from the pit, the agreement with the observations of Kligler is considerable.

Dr. C. T. Nesbit (formerly health officer of Wilmington, N. C.) made experiments in New Hanover County, N. C., in 1917, and found pollution of the ground water around effluents from L. R. S. tanks, in some cases up to 20 feet from the effluent pipe, beyond which distance he made no tests. The results in this case were generally such as to indicate that the sand-clay soil in that neighborhood does not fully protect the ground water from fecal pollution, nor prevent the travel, with the underground water, of such pollution for uncertain distances.

This was borne out by the bacteriological examination of about 700 shallow driven wells located in the city and county. The only wells of this kind found free from pollution were those located 200 to 500 yards away from any concentrated source of pollution, as stables or privies. The bacterial counts in those wells not so located were extremely high, and the presumptive tests for colon bacilli almost unfailingly positive.

The above reports are, perhaps, conflicting in places, but it seems clear that the type of soil and the depth of the water table are highly important factors. It seems also that, until further data have been obtained, the borderline cases of high water table and unfavorable soil conditions should be considered dangerous, and that types of sewage disposal liable to polluute the ground water should be avoided as much as possible. In the matter of water supplies, shallow wells drawing from ground waters exposed to such pollution should also be avoided, or, at least, kept under close scrutiny.

### A Paving Record in Indianapolis

The 1921 paving record of Indianapolis, Ind., is almost 50% greater than its previous best record, that of 1915. Paving has been completed or contracts have been awarded for a total of nearly 600,000 square yards. During 1918 the amount of paving was reduced to 56,000 square yards because of the war and that done in 1919 was far below normal because of high prices; but in spite of this the total for the four years just ended will reach approximately 1,185,470 square yards, which is little below any previous four-year period. The Board of Works has completed the procedure for several additional contracts, totaling 123,130 square yards, and bids for these will be received shortly after the first of the year.

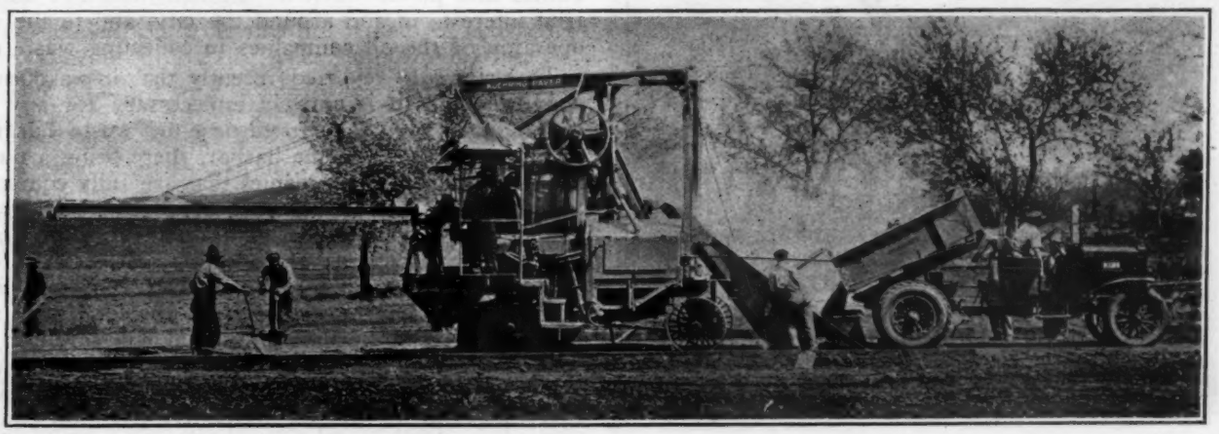
The largest part of the paving during the past four years has been asphalt or bituminous concrete. The work completed or under contract for early completion in 1921 comprised 77,537 square yards of new asphalt, 22,652 square yards of asphalt resurfacing, 170,062 square yards of bituminous concrete, 10,842 square yards of new brick, 5,118 square yards of brick resurfacing, 79,755 square yards of concrete, 3,729 square yards of granite block resurfacing, 10,480 square yards of wood block resurfacing, 17,378 square yards of grading and graveling, and 4.77 miles of grading alone.

# Horicon-Beaver Dam Road

**Five and one-half miles of 18-foot concrete surface laid in 54 working days. Aggregate for four miles stored at mixer before concreting was commenced. Total force,—fifty-three men.**

An important factor of the rapid construction of the Horicon-Beaver Dam road on Route 118, Dodge county, Wisconsin, was the installation of sufficient well selected plant, a thorough co-ordination between the equipment and the operation, and the efficiency of the organization. Care was taken to provide the principal requisites in advance so that no waiting was necessary and the work, except for interruptions, mostly due to unfavorable weather, was carried on rapidly and vigorously with little interference, delay or lost motion.

About two months before the mixer was installed the contractor, the Wisconsin Construction Company, secured a piece of railroad track and right of way about 1,000 feet long with a strip of land 50 feet wide alongside, which he used principally for unloading and storing at Rolling Prairie, the point



DELIVERING AGGREGATE FROM TWO-BATCH TRUCK TO PAVING MAC HINE, HORICON-BEAVER DAM ROAD

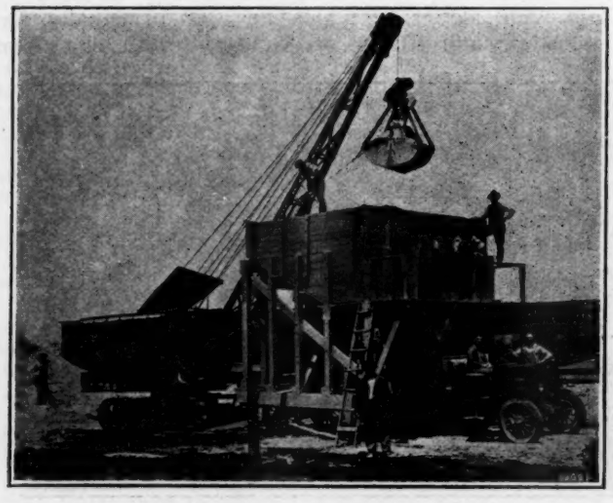
of railroad delivery. Sand and stone were received at the rate of 10 or 12 carloads daily, and unloaded by a Northwest Engineering Company's locomotive crane with a 40-foot boom and clamshell bucket, which stored the sand and stone in parallel piles respectively 20 feet and 50 feet wide at the base and together containing about 10,000 yards of aggregate, sufficient for nearly 4 miles of roadway.

The derrick also loaded when convenient directly into a small portable storage bin and at other times reclaimed the aggregate and delivered it to the bin, keeping the latter filled to supply by gravity measured batches to the trucks in which it was transported to the mixing machine.

The bin was approximately 41 feet square and 18 feet high, made of white oak throughout. It was mounted on road wheels, 40 inches in diameter and with 12-foot base. Attached by a rigid 10-foot pole to the crane mounted on multiplanes, it was moved forward as the crane moved, thus making unnecessary the peaking of the boom at any time. The bin was supported at three points, on the two rear wheels and on the fifth wheel of the front axle. In this way strains due to uneven bearing were reduced to a minimum. About 15 yards of sand and 25 yards of stone were at all times maintained in the bin. Two measuring hoppers, mounted below the bin floor, were so designed that they could be adjusted to give required proportions of concrete. Levers controlled from the platform operated the upper and lower cut-off gates.

Two-compartment Nash trucks backed under the bin, received 27½ cubic feet of aggregate in each compartment, and drove to the cement shed where they were loaded with 2½ barrels of cement in bags, emptied directly on top of the aggregate. The truck hauled the materials to the site of the work, turned and backed into the skip of the 21-E Koehring paver, discharged the first batch and moved forward about 2 feet. The skip was then raised, the material charged into the drum of the mixer, the skip lowered and the truck again backed into the skip, discharged the second batch and returned for another load.

When mixed, the concrete was discharged into the boom bucket of the spreading type with a door opening transversely instead of longitudinally, that consisted of a single leaf, hinged at the back of the bucket and released by the man on the operator's platform. The concrete was spread in an even layer as the bucket was drawn back. When it was desired to push the concrete into a corner, this was readily accomplished by reversing the motion of the bucket and using its door as a plow. The finishing was done by hand by the use of a strike-off board followed by roller and belt.



FILLING MOVABLE BINS AND LOADING TRUCK

The total crew of 53 men included: 1 crane operator, 10 cleaning up cars and assisting around plant, 7 handling cement at cars and warehouse, 1 bin operator, 1 loading foreman, 11 trucks with drivers, 2 dumping trucks, 1 mixer operator, 6 finishers, 2 form setters, 4 extra men sprinkling and covering cement, 7 or 8 men on grade ahead of mixer.

The day following the placing of the concrete it was protected by covering with earth.

The first mile of highway was built, even with an average round trip haul of between 7 and 8 miles, in 9 working days. This does not mean 9 calender days, for due to rainy weather it was possible to work only 9 days out of 20. This quantity was placed with a green crew and green truck drivers. The work is in charge of P. C. Kroeck, sole owner of the Wisconsin Construction Company, who is being assisted by A. G. Brown and Geo. H. Kies.

## Oil Pollution of Navigable Waters

Several cities lying adjacent to navigable waters, and especially harbors used by ocean going vessels, have been troubled with the pollution of the waters by oil from oil-burning vessels. New York and the coasts within its vicinity have been especially annoyed, bathing beaches being spoiled and shipping, docks and other timber structures being threatened by possible conflagration of the oil floating on the surface.

Some months ago a conference was called in New York of business men and others who were interested in the elimination of this oil nuisance and a committee was appointed to investigate the problem and suggest remedies. Since the date of that conference there has been a noticeable improvement in conditions, which has been contributed to the publicity given to the matter of the calling of the conference, to the efforts and public spirit of the maritime and industrial interests in and around the city, and to the cooperaton of the oil companies in collecting waste oil.

The committe reported recently that it was firmly convinced that it is entirely unnecessary for any oil burning ship or plant to dispose of waste oil into or near the waters of the harbor, there being a number of oil salvaging companies that are fully equipped to collect and properly dispose of all waste oil from either ships or plants. In addition to this, there are now practical methods of collecting waste oil by the use of settling tanks or centrifugal separators and there is being developed a system of centrifuges for installation on oil-burning ships that will care for all waste bunker oil, similar to systems which are already in use in commercial oil-burning plants. It is believed that the value of the oil recovered from the waste will pay for the installation in a short time, but unless

the various oil-using ships and establishments are induced by arguments of economy to recover the waste oil, they should be required to adopt this or some other plan for eliminating the discharge of oil into harbor waters or in fact into public waters of any kind.

## Garbage Disposal for Norristown

A committee was appointed by the borough council of Norristown, Pa., on October 4th to study and report upon the problem of collecting and disposing of the garbage of that borough, and early in December it submitted its report. In this report it states as its opinion that a reduction plant would cost about $150,000 and that the net cost to the borough, after allowing for the sale of grease and tankage, would be about $15,000 a year. In view of this cost and also of the fact that garbage does not appear to be so rich in greaes as it was before the war and that the amount received for garbage grease is very much lower than formerly, the committee does not recommend this plan.

Considering incineraton, the committee was advised that an incinerator suitable for the borough would cost only about $25,000 to $30,000 but that, as there would be no by-products to sell, the net cost would considerably exceed $15,000 per annum.

The only other method considered suitable for the borough was hog feeding, and this the committee recommends. It proposes that the privilege of collecting the garbage be given to "one or more reliable persons who would agree to enter into a contract for the proper collection and disposal of garbage for the entire borough, under an ordinance that would properly protect the borough and citizens of the municipality." The committee had learned that several persons were willing to enter into such a contract and give a bond guaranteeing faithful compliance with it. Most stringent rules and regulations should be made and enforced to provide for a prompt and sanitary collection of the garbage.

In making this recommendation the committee kept in mind the apparent fact that the quality of garbage and methods of disposing of it are in a more or less transition and experimental stage and that it is probable that in the near future some other method may have to be adopted for disposing of it, but in the meantime hog feeding seemed to be the best temporary method of disposal.

The council, on receiving the report, directed the board of health to prepare specifications and advertise for bids in line with the committee's report.

## Hydraulic Fill Dam Core Severely Tested

The great Englewood Flood Retarding Dam that is now in an advanced stage of construction by the Miami Conservancy Commission is being built by the hydraulic fill method, in which the material for the high earth embankment is excavated, transported, deposited and compacted by hydraulic methods which are used to place the heavier material in the outer faces of the dam, and to build up the interior with a watertight core, deposited by sedimentation of fine particles of earth, silt and sand carried in the water which forms a pool on the axis of the dam. The rate of overflow and supply to the pool can be regulated so as to govern the dimensions and qualities of the core, as described in previous articles published in this journal.

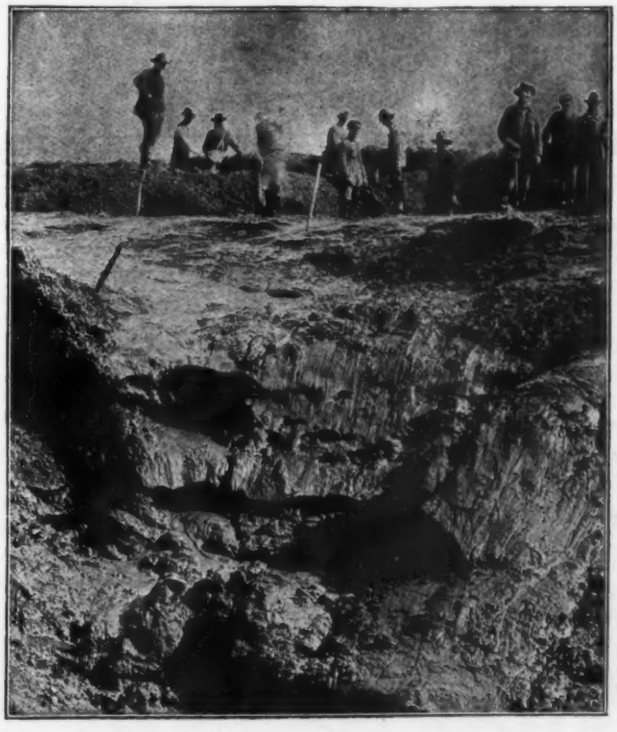
On the night of October 25th the core pool overflowed on the upstream side of the dam when the latter had been completed to within 12 feet of the top, making a narrow shallow pool 4,600 feet long, the water in which escaped with sufficient violence to cut a deep gulley down the dam slope.

The upper edge of the erosion exposed about 30 feet vertical height of the core, which was so firm that it stood up like a wall and resisted the violent rush of water so well that very little of it was eroded. The portion which was detached was so solid that it broke up in chunks many of which measured over one cubic yard and were found unbroken where they were washed and deposited by the flood. Out of about 7,000 yards of material washed out only a little more than 10 percent was core material and the behavior of the latter was so good as to afford a satisfactory demonstration of the results of the depositing and consolidation processes used in the construction. The eroded face of the core was nearly vertical and the result of the severe test was considered better than could have been expected.

## Pulling Sheet Piles With a Luff Tackle

In the construction of the foundations for a large power plant at Bridgeport, some of the excavations had to be carried down 70 feet below water level through earth, boulders and quicksand and there were driven three cofferdams, requiring about 2,000 Lackawanna sheet piles 38 feet long penetrating full length in quicksand.

They were driven by a No. 4 McKiernan-Terry steam hammer, handled by a derrick boom, at the rate

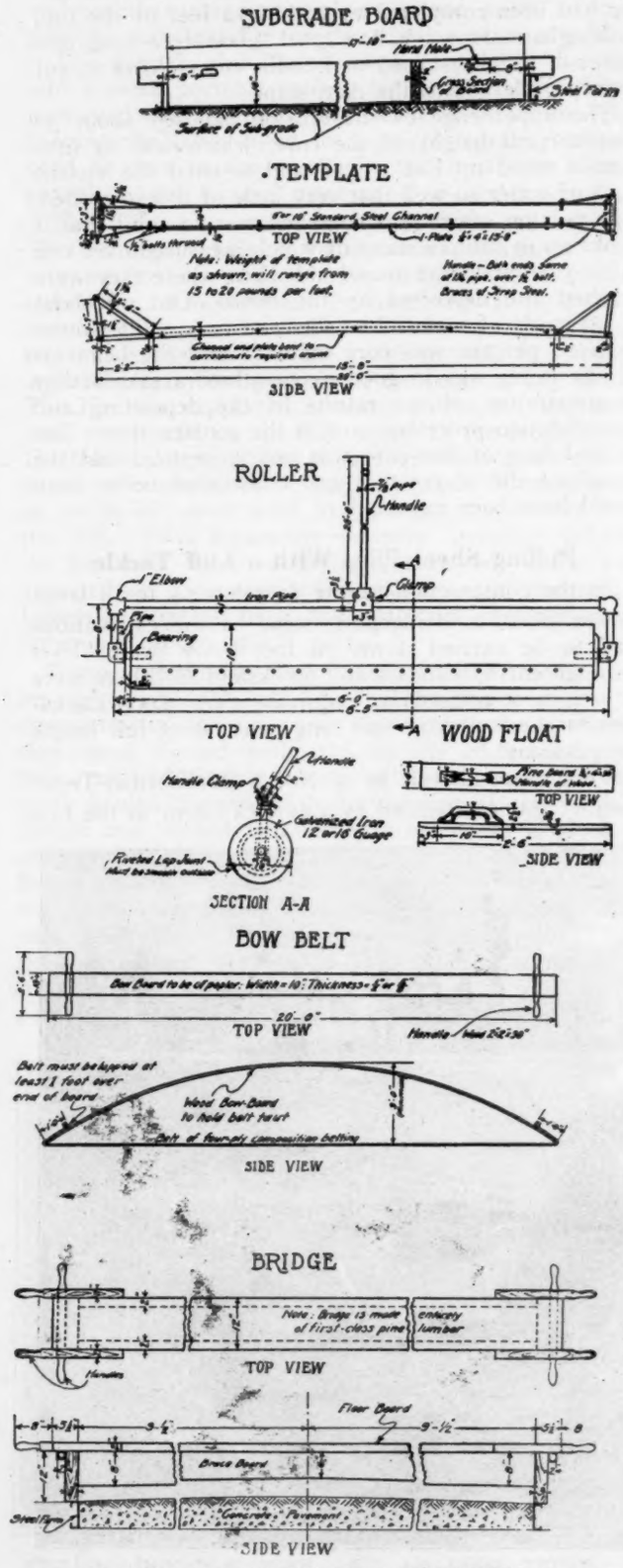


CORE EXPOSED AT ENGLEWOOD OCTOBER 26, 1921.

of about 50 piles per 8-hour day. Attempts to pull the piles with the same hammer failed to start them although the 2½-inch connection bolts sheared through the pile webs.

Finally the superintendent for C. W. Blakeslee & Sons contractor, devised a successful method of pulling them with a hoisting engine and luff tackle that developed an estimated strain of about 150,000 pounds. A pair of 5-sheave blocks, weighing about 1,600 pounds each, were rove with ⅞-inch plow steel cable and suspended from an A-frame 48 feet high with 12 x 24 inch-legs braced by 6 x 12-inch struts, and capped with a 12 x 36-inch heavily ironed girder made of three 12 x 12-inch timbers bolted together and guyed by one front and two rear 6-part tackles.

The main tackle was connected to two 2½-inch bolts through the pile web, and its lead line was operated by a 7-foot tackle operated by a 10 x 14-inch hoisting engine. The heavy strain soon equalized the bearings of the two bolts and the piles were pulled at a maximum rate of 10 per day.




DETAILS OF ROAD-MAKING APPLIANCES

# Concrete Pavement Construction*

### Homemade tools and their use for finishing operations

Special care should be taken to secure smoothness and uniformity of the road surface, regardless of the quality of materials employed, because the smoothness is most apparent and by it the road is judged by the general public. Lack of uniformity on the subgrade is responsible for many cracks in the concrete surface. Many longitudinal cracks might have been prevented by thorough preparation of the subgrade with special scarifing and rolling when the concrete was laid on an old road surface not much below the new one.

Side forms should be of steel, always weighing not less than 6 pounds for hand finishing and 8 pounds per linear foot for machine finishing. They should be braced at frequent intervals, and both alignment and grade should be checked by the inspector just in advance of the concreting; no concrete should be laid until at least 200 feet of forms are in position and as fast as the forms are moved ahead they should be thoroughly cleaned and oiled.

After the side forms have been placed, the surface of the ground should be checked with the subgrade template which may be made as per sketch, or may be finished with a steel bottom edge forming a sharp blade, and have hauling chains attached by which the subgrade can be shaved to an exact profile when the board is drawn over it.

After trimming and testing, the subgrade should be thoroughly wet to avoid undue absorption of water from the concrete. After the concrete has been placed it should be struck off by a heavy steel channel template weighing from 16 to 20 pounds per linear foot so that it will not be unnecessarily raised from the forms that guide and support it, and so that the workmen will move it with a crosswise motion. The weight will also obviate the danger of its being used for

*Abstract of paper ready by P. E. Schnepfe at North Carolina Highway Department District Engineers Meeting, August 12.

tamping, which is sometimes done with wooden templates. The absence of tamping will tend to reduce to a minimum the excess of water in the surface of the roadway.

A few minutes after the concrete has been struck off, the time depending upon the rapidity of set and the condition of the atmosphere, the concrete should be rolled to remove excess water and produce a denser and stronger concrete. The roller shown is made of 12 to 16 gage galvanized iron, is from 8 to 10 inches in diameter, and weighs approximately 60 pounds. The roller should be used transversely across the road from one form to the other and back again, then advance longitudinally 3 feet, be rolled across and back and so on over the entire section, repeating the operation at short intervals for three times, after which the concrete should be rolled similarly but in a diagonal direction to remove any irregularities left by the transverse rolling.

After the rolling, the surface should be finished by a composition belt forming the horizontal chord, about 2 feet longer than the width of the roadway, of an arch bow that holds it under tension while in use and is provided with handles, not shown in the sketch, for its more convenient operation.

The belt should first be applied with a diagonal sawing motion, produced by pulling it transversely and moving it longitudinally at the same time. After going over the surface in this manner the belt should be used a second time with a longitudinal movement only, omitting the transverse movement. The belting should be completed by a third operation consisting of a longitudinal movement.

The upper corners of the concrete should be rounded by an edging tool with a 1-inch radius, after which any imperfections appearing in the surface should be eliminated by a trowel and wood float operated from a light moveable bridge supported on the side forms.

Strips of burlap 3 feet wide and as long as the width of the road should be thoroughly wet, the excess moisture removed by shaking and then they should be spread over the freshly finished concrete and kept wet with a hose until next day when they should be removed and replaced by a thin layer of earth kept wet by sprinkling for several days.

When finishing machines are used they should be handled by competetnt operators and at least three men with shovels should work in advance of the machine to remove excess concrete and leave it about an inch higher than the final elevation after it has been machined. In the first operation of the machine the template strikes off the concrete and the tamp gives it density, the second operation the tamp is dispensed with so that only the template and belt are used, and in the third and last operation the belt only should be used.

### Sewage Gas As Motive Power

A paper with the above title was read before the Institution of Municipal and County Engineers of England a few weeks ago by John D. Watson of Birmingham on the occasion of a meeting of the members of that institution in this city. Before the meeting the members inspected one of the city's sewage disposal plants where an application of sewage gas for operating an internal combustion engine was inspected with considerable interest.

The drainage board having approved plans for employing a suction gas engine for pumping the sewage, it was decided to test the use of sewage gas for operating the engine. The plant installed is designed to give 25 hp. for 6 hours a day. It comprises a 34 hp. horizontal gas engine of the ordinary suction type, a 5-inch centrifugal sludge pump, a small sludge pump well, and a sludge digestion tank constructed of concrete in two sections. A small gas holder was necessary, without which it would be impossible to keep the engine running more than one hour and a half or two hours consecutively. Only the amount of sludge required to give off the gas needed for power will be subjected to fermentation, and judging from the limited experience available it was estimated that about two tons of wet sludge (10 percent dry solid matter) per day will be required to provide an explosive gas capable of generating 25 hp. for a working period of 6 hours per day. The amount of sludge available at this plant is approximately 80 tons per day of 10 percent dry solid matter.

Mr. Watson stated that 400,000 tons of wet sludge —27,000 tons of dry solid matter—were dealt with at the main sewage plant of Birmingham every year and 320,000,000 cubic feet is gasified.

In connection with the paper, Mr. Watson read a letter from Lord Elveden who wrote that he had obtained inflammable gas from manure and had run a 2 hp. gas engine with such gas in the raw state as it came from the generator and that this gas had been used for operating a gas stove for cooking, having been collected in an old gas bag similar to those used during the war on motor cars which were being run by gas instead of by gasoline.

## Testing and Inspecting Concrete

**Concrete is considered by the Ontario Hydro-Electric Power Commission to be a manufactured article, and expert supervision is maintained of both materials and the combining of them.**

The Hydro-Electric Power Commission of Ontario is one of the largest manufacturers of concrete in the world. Before the completion of the Queenstown Chippawa power development, over half a million cubic yards of concrete will have been placed by the commission in various structures. This means an expenditure for materials alone of over $3,500,000, and a cost for the labor and plant necessary to convert these materials into concrete of as much more. Obviously the commission is interested in any means of cheapening a product of which it is such a large user and would be justified in undertaking any legitimate steps to this end.

Concrete is not a material of uniform quality. There is good concrete and poor concrete, and un-

fortunately the latter is not uncommon. Many concrete structures built but a few years ago are to-day showing unmistakable signs of disintegration. Concrete differs from nearly all other structural materials, for it is manufactured upon the site of the structure of which it is to form a part. The steel for a steel structure is manufactured in a highly organized steel mill under rigid control, is then fabricated in a well-equipped structural shop, and on the job it is only assembled in place; but in the case of concrete the only manufactured material used is the cement, the rest of the ingredients being raw materials obtained locally and the whole is combined on the job to form concrete. Making concrete is thus a manufacturing operation.

In manufacturing, a product of uniformly high quality can be obtained only with proper materials processed under the immediate supervision of experts.

This holds true for concrete and for this reason the commission maintains a system of rigid inspection of all materials and processes in its manufacture. The commission some years ago began to study and develop methods for inspecting and testing concrete and concrete materials and for proportioning, mixing and placing them in the field. The methods adopted are thought to be in advance of those of any other large concern in Canada if not in the world. The engineers believe that they are enabled to guarantee the quality of the concrete and in most instances to cheapen its cost.

The methods consist in brief of mill supervision and sampling of the cement to enable the necessary tests to be carried out prior to its arrival on the job, and of laboratory tests to determine its quality. In testing sand and stone, after preliminary studies have been made to determine the suitability of the material and its concrete-making properties, periodic tests of the material as supplied are made to determine its gradation, cleanliness and the proportions of the cement which must be used to obtain the desired results. In addition, the sources of the materials are kept continually under observation.

The proportions of cement, sand, stone and water that, under any given conditions, will give concrete of the desired quality are determined by a method of proportioning known popularly as the "surface area" method, although that used by the commission is somewhat different from this method as generally understood. The modified surface area method was developed in the laboratories of the commission as a result of its experimental investigations and researches. The method is simple and practicable and offers an effective way of determining proportions.

The inspection of concreting operations includes all details in connection with proportioning, mixing and placing. An effort is made to see that all materials are accurately measured, that the batches are properly mixed and that the methods of placing are so arranged as not to interfere with the quality of the concrete delivered. Inspection is also maintained over the preparations preparatory to placing concrete, on its deposition in the forms, on the removal of the forms and on its final finishing. As a check on the correctness of the proportions used and the methods pursued, specimens of the concrete produced are obtained for test periodically. The test specimens are six or eight-inch cylinders. They are taken directly from the wet concrete already in place in the forms and are moulded and cured under standardized conditions. Some are tested when seven days old, others when twenty-eight days old, by crushing them to destruction in a hydraulic press and noting the force required to accomplish this.

Preliminary to actual construction the laboratories examine all available materials and determine those suitable for use. When construction is about to begin they make further studies to determine the proportions which will give concretes of the different classes to be used. During construction a concrete engineer from the laboratories is assigned to the staff of the resident engineer in charge of the job to assist him with the concrete work. Thus at all times close contact is kept between the laboratory and the field.

A field laboratory is installed on each of the larger jobs. This laboratory is equipped with apparatus to carry out the necessary tests and to get the information needed in setting the proportions. The required apparatus is simple and of slight cost and requires but small space to house it. The tests likewise are simple and cheaply made.

The concrete laboratory of the commission is very completely equipped for the investigation of problems in connection with concrete and is staffed with men especially trained in this work.

## Municipal Use of Farm Land

In 1910 the city of Philadelphia purchased a tract of land containing something over 1000 acres with a view to using it as the location of a sewage treatment plant. It will be several years yet before the land will be used for this purpose, and meantime no other use appeared possible except the original one of cultivation. Both the land and the buildings upon it were therefore leased to tenants and the city thus obtained a slight return on its investment of over $738,000.

About a year ago, however, the Department of Public Works took over about 350 acres of the property, which had been yielding the city slightly less than $800 during the last two years of tenant occupancy, during which time the improvements had fallen into a bad state of disrepair. The city proceeded to put the dilapidated premises into excellent condition and is using the land as a model farm whereon to quarter the horses used by the Departments of Public Works and Public Safety. In November, 1921, eighteen police horses and 84 public works horses were kept there. A considerable part of the farm is devoted to pasture and about 250 acres were tilled in 1921 and yielded about 2300 bushels of oats, 1500 bushels of corn and 400 tons of hay, which are used by the various city departments. In addition, hens on the farm furnish fresh eggs for the city hospitals. The city this year has not received the $800 rental but instead has produced farm products of much greater value.

This year's work, however, is considered to be only a beginning. With the beginning of 1922 the Department of Public Works will take over the street cleaning of the city and the refuse collection and will have about 2000 horses engaged in this work.

The model farm will be used in connection with assembling these horses and providing pasture and stables for them and for the new animals that must be added from time to time or for horses that need rest or medical or surgical attention.

On the farm is a horse hospital which is said to be second to none of its kind. The floor is cement, each of the 16 stalls is adequately drained, it is abundantly lighted through windows by day and by electric lights at night, and is ventilated by a remarkably complete system. At one end of the building is an operating room with operating table, a mask for etherizing horses and a recovery stall. So attractive and neat is the interior of this stable that in October the American Humane Association held a buffet luncheon in it.

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# Pennsylvania Policies as to Public Sewerage*

By W. L. Stevenson, M. Am. Soc. C. E.†

**Policies adopted by the State Department of Health in administering the "Purity of Waters Act." Degree of treatment of sewage required varies with the conditions of each case.**

The Legislature of Pennsylvania in 1905 enacted the "Purity of Waters Act" for the protection of the public health by controlling public water supplies and by prohibiting the discharge of sewage into the waters of the state.

But the act provides that in the case of municipally owned sewers, the Commissioner of Health, with the unanimous agreement of the Governor and Attorney General, may permit the discharge of sewage subject to such conditions as he deems will subserve the general interests of the public health.

The evident intention of this prohibition and provision for discharge under certain conditions is to provide for varying degrees of sewage treatment, so as to maintain the streams in a reasonably clean condition and to make it practically and economically possible to use certain waters of the state as sources of public water supply and for other purposes requiring a hygienic standard.

Streams are the natural drainage channels for rainwater flowing over the surface of the land and conveyed to them by rainwater conduits from the towns of their watersheds.

It therefore follows, even if all sewage were excluded or completely purified, that no surface water from a populated watershed would be fit for use as a public water supply without some form of purification to eliminate the natural contamination of the surface stream.

It is possible to produce a clean, colorless and bacteriologically safe water supply from a grossly polluted and contaminated source. It is also possible to purify sewage to such an extent that it will be freed from all its polluting and contaminating constituents; but both procedures are exceedingly costly and often unreliable.

Therefore, the wise and just administration of the "Purity of Waters Act" should be based upon an economic consideration of the uses and conditions of the various waters of the state so as to secure the greatest protection to the public health by the least expenditure of public and private funds for construction and operation of water purification and sewage treatment works.

The Engineering Division of the Pennsylvania Department of Health is charged, among other things, with the examination of plans of sewerage and sewage treatment works submitted with applications for issuance of permits, also with making field investigations and recommending to the Commissioner of Health the conditions under which permits may be issued.

To obtain as nearly as possible uniform practice in this work, certain fundamental policies, given below, have been erected but it must be borne in mind that the wide range of uses and conditions of the waters of the state makes it utterly impracticable to erect definite detailed policies that will be statewide in application.

In the following, the word "stream" is to be considered to include all lakes, ponds, or other waters of the state, and where policies are given for streams used as sources of public water supplies, they apply equally to streams used for other purposes requiring a hygienic standard, such as bathing and ice harvesting.

### CLASSIFICATION OF STREAMS

The problem of administering that part of the "Purity of Waters Act" relative to sewerage has three phases:

(1) Prevention or abatement of nuisance.
(2) Protection of sources of public water supply.
(3) Maintenance of clean streams.

Streams even though they are not used as sources of public water supply, should as a matter of decency be maintained in a reasonably clean condition, i.e., free from sludge deposits on the bed or banks, ebullition of offensive gases, undue turbidity, discoloration, floating solids or any other nuisance to sight or smell of sewage origin.

Streams used as sources of public water supply should, in addition to being reasonably clean, provide a raw water sufficiently low in organic and pathogenic bacterial content that it can be safely and economically purified for domestic purposes.

Small streams flowing through highly developed suburban territories or land devoted to park purposes for the pleasure and recreation of the public, demand a very high degree of protection and should be so clean that they show no appreciable evidence of sewage.

### DEGREE OF SEWAGE TREATMENT REQUIRED

The ground water drained or pumped from coal mines contains considerable sulphuric acid which acts as a germicide upon sewage discharged into streams receiving such mine drainage, thus minimizing the

*Paper presented before symposium on Stream Pollution and Sewage Disposal, held by the American Society of Civil Engineers.

†Assistant Chief Engineer, Pennsylvania Department of Health.

danger of creation of nuisance or menace to the public health; also these streams frequently carry large quantities of fine coal which mask any visible evidence of sewage matters.

Therefore, at points reasonably remote from water works intakes, sewage may generally be discharged untreated into these streams, but preferably from the outlets of the several drainage areas and always into the main current of the stream so as to prevent local nuisance at the immediate point of discharge and to more effectively distribute the sewage in the stream and thus take full advantage of dilution by the water of the stream and the germicidal action of the acidity.

If the rate of flow and velocity of streams not used as sources of public water supplies are insufficient to inoffensively assimilate crude sewage, then such a degree of treatment should be required as will lighten the load of organic matter upon the stream so that the desired conditions of cleanliness will be maintained even during times of drought.

The assimilating power of the stream should be equitably distributed among the various municipalities along its course so that one town will not be required to treat its sewage to a high degree because a neighboring community upstream has overtaxed the stream with insufficiently treated sewage.

In the case of streams used as sources of public water supplies, sewage treatment should be required to a sufficient degree to produce an effluent which after being carried by the stream to the waterworks intake below, will not prejudice the safe and economical purification of the water of the stream for domestic purposes.

Ample diluting water and sufficient distance between the waterworks intake and the place of sewage discharge may reduce the required treatement of sewage to a negligible degree.

### CLEANING STREAMS

Action taken toward cleaning sewage polluted streams not used as sources of public water supplies or to maintain such streams in a clean condition should be begun at the upper end and progress down stream.

Action taken to protect streams used as sources of public water supplies should be, in general and subject to local condition, begun at the first source of sewage contamination above the waterworks intake and progress upstream.

### SEWER SYSTEMS

Every municipality should have prepared and submit to the State Department of Health for approval, a comprehensive plan of sewerage before undertaking the design of new sewers or the extension of existing sewers as may be needed from time to time.

In sewering new drainage areas the comparative cost should be estimated of

(1) Collecting sewage and rain water in separate conduits, and

(2) The use of the combined system with interception of all dry weather flow of sewage and such a percentage of storm water contaminated with sewage as will afford the required degree of protection to the receiving body of water..

In extending existing combined sewers in municipalities having well improved highways, the relative economy of continuing the combined sewers or of replacing them with separate sewers should receive careful consideration in connection with the relative protection afforded to the waters of the state.

Contiguous or adjacent municipalities should be urged to give careful study to the possible advantage of entering into agreements for the joint construction and operation of intercepting sewers and sewage treatment works.

### SEWAGE TREATMENT WORKS

In cases where sewage treatment is not required at present, general outline plans of the project should be submitted to the State Department of Health for approval. They need only be prepared in sufficient detail to demonstrate the feasibility of constructing the intercepting sewers and sewage treatment works, to show that the site of the proposed work is properly located, ample in area, and of suitable topography for the erection of treatment works sufficient for the needs of the municipality.

The advance in knowledge of sewage treatement in past years indicates possibility of even greater improvements in the future, hence it is inadvisable to prepare detail plans until it becomes necessary to construct the works.

If the approved site is at all liable to be acquired for private use the municipality should forthwith acquire it, so as to be prepared to treat the sewage when necessary.

In cases where the use and condition of the stream is such that sewage treatement is required at the present the plans should show in detail the portion of the works required for the needs of the present and reasonable future and in general outline the extensions rquired for increased rate of flow and higher degree of treatment probably needed in the more distant future.

The operation of oxidizing processes of sewage treatment works, whose only purpose is to prevent the creation of a nuisance in a stream not used as a source of public water supply, may upon request and with the specific approval of the State Department of Health be suspended during the colder part of the year when the greater quantity of dissolved oxygen and lessened biological activity in the stream will permit the discharge of unoxidized sewage.

## Another Rock Tunnel Record.

The Construction Co. of North America, contractor for driving the 11-foot 3-inch rock tunnel in the mountain division of the Hetch Hetchy water supply for the city of San Francisco has recently established a new record for speed in driving a total length of 37,453 feet from the beginning of work in 3,490 shifts, making an average as 6.1 feet per shift in all of the eight headings driven. The best progress made was 776 feet per month, through slate rock. Through granite it varied from 273 to 477 feet per month with 45 to 48 holes per round as compared with 25 holes per round in the slate. In the diorite rock, progress was 406 to 420 feet per month with 25 to 34 holes per round.

# PUBLIC WORKS.

Published Weekly
at 243 W. 39th St., New York, N. Y.

S. W. HUME, President J. T. MORRIS, Treasurer

Subscription Rates
United States and Possessions, Mexico and Cuba $3.00 year
All other countries .....$4.00 year

Change of Address
Subscribers are requested to notify us promptly of change of address, giving both old and new addresses.

Telephone (New York): Byrant 9591
Western office: Monadnock Block, Chicago
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## CONTENTS


SOIL AND WATER POLLUTION—By W. A. Hardenbergh ..... 497
A Paving Record in Indianapolis..... 499
HORICON-BEAVER DAM ROAD—Illustrated..... 499
Oil Pollution of Navigable Waters..... 500
Garbage Disposal for Norristown..... 501
Hydraulic Fill Dam Core Severely Tested—Illustrated 501
Pulling Sheet Piles with a Luff Tackle..... 501
CONCRETE PAVEMENT CONSTRUCTION—Illustrated ..... 502
Sewage Gas as Motive Power..... 503
TESTING AND INSPECTING CONCRETE..... 503
Municipal Use of Farm Land..... 504
PENNSYLVANIA POLICIES AS TO PUBLIC SEWERAGE—By W. L. Stevenson..... 505
Another Rock Tunnel Record..... 506
EDITORIAL NOTES ..... 507
Discretion in Enforcing Sewage Treatment—Standardized Contracts—Bituminous Fillers for Brick Pavements.
Contract Standardizing Conference..... 508
Decision in the Hetch-Hetchy Suit..... 509
The Cost of Water Waste..... 510
Algae Tastes in River Water..... 510
RECENT LEGAL DECISIONS ..... 511


### Discretion in Enforcing Sewage Treatment

That every city and smaller community and every commercial plant producing liquid wastes should be required to treat its waste waters so as to bring them within a certain fixed limit of impurity was the idea of sanitarians of a short generation ago. In many cases in New England the effluents of sewage purification plants actually were purer than the streams into which they discharged. England established and re-established standards for effluents which were continually being found impracticable of enforcement.

A more reasonable and enforceable attitude, and one more logical from some points of view, is now taken by sanitarians and law makers. It is recognized that streams must receive drainage from their watersheds until natural laws are superseded by man-made ones, and can not be kept "pure," and that the expense to which communities or individuals can be compelled to go to reduce the amount of pollution they contribute to the streams must be determined by reasonable consideration of the special conditions affecting each case.

The requirements made of some communities, such as those which drain to streams that must be used as a source of water supply, must be more stringent than are necessary in the case of others, such as those draining into salt water or the lower courses of streams already polluted. To draw up laws and regulations that will fit all cases would be impracticable, for each case differs in some respects from almost every other, conditions are continually changing and a standard set of a given city today will not be suitable in five or ten years from now, and knowledge and practical possibilities are continually developing along old and in new directions.

The making and enforcement of regulations governing sewage treatment must therefore be placed in the hands of some commission or individual who is granted powers of discretion in adapting them to individual cases. These administrators of the sanitary powers of the state therefore occupy a very responsible position and one calling for a degree of judgment and wisdom not demanded of most public officials.

It is very gratifying to know that one of our most populous states, and one in which the stream pollution problems are especially difficult of satisfactory solution, has so wisely selected the members of its state health department. Their attitude toward this question is stated clearly and at length in this issue. It is based upon "an economic consideration of the uses and conditions of the various waters of the state so as to secure the greatest protection to the public health by the least expenditure of public and private funds for construction and operation of water purification and sewage treatment works."

Too often state as well as local health departments are placed in charge of physicians who consider their duties to stop with securing "the greatest protection to the public health" and who fail to give any consideration to "expenditures of public and private funds" as something in which they are in no way concerned. In the end the public health will receive much greater protection from the Pennsylvania type of health department than from the narrower-minded ones which encounter opposition at every step because of their inability to realize that even health work is inter-related with public finances and can not expect all other interests to give way to it, or to the present officials' idea of how it should be conducted.

### Standardized Contracts

It is universally agreed that the innumerable variations in the forms and requirements of construction contracts are a prolific source of misunderstanding, expense, and delay and there has long been an increasing demand for some uniformity of contract form.

Heretofore the majority of engineers and architects have used the most convenient contract available as a general pattern on which to write a new one, often modifying it far more than was necessary to suit requirements, sometimes with little regard to the actual necessities of the case or even for the apparent purpose of making their orginality impres-

sive. This, of course, causes much confusion and complication, which is increased by the great extent to which contracts and specifications have been confused and the loose way in which classifications and requirements are combined. Another very serious fault is the frequent tendency to write the contracts in an unfair spirit so as to put all of the risk and responsibility on the contractor and keep all the profit and advantage to the owner, with the engineer as the sole arbitrator.

It is probable that many of the disadvantages can be greatly reduced by the rational plan proposed at the recent conference described in this issue. The efforts of this conference, as there outlined, may well produce a reasonably compact foundation, which will serve for many typical jobs and should be, if properly prepared, adopted as widely as possible and modified as little as possible.

It is to be hoped that the proposed standard contract and general conditions will confine the latter as much as possible to recognized standards of materials, methods, operations, workmanship and equipment, with special consideration for unmistakable classifications, interpretations, definitions and thorough provision for changes of quantities, recognition of unforseen contingencies, and just treatment for the contractor in the payment for temporary and auxiliary construction, change of materials, change of plans, and extra services.

In the final analysis the contract and specifications should define and record "the meeting of minds" on the general features of the case and afford a foundation and provide an agreement on predetermined facts, and accepted standards and provide the basis for honest co-operation and concessions between the competent engineer, the contractor and the owner.

The most successful contract forms, however, cannot be universally adopted and there will be many occasion when it will be entirely advantageous to modify them on the unit price basis, the cost plus percentage basis, the cost plus fixed fee basis, the profit and loss sharing basis, and the various combinations of these and other types that have been tried, praised and condemned.

The ideal contract is the simplest and fairest, as short as will cover essential features and intended to clearly deprive essential requirements and responsibilities and promote this most suitable quality of construction, efficiency of work and materials and conserve the rights and interests of both parties when executed wtih honesty and ability.

## Bituminous Fillers for Brick Pavements.

At the annual meeting of December 1st of the National Paving Brick Manufacturers' Association, a resolution was adopted and confirmed by the board of governors "declaring the asphalt filled types of brick wearing surfaces as the preferred types of the National Association for general use, without prejudice to other types which may have particular adaptability for special local conditions."

This resolution gives formal assent of the association to a view already embodied in the specifications for 1921 that were issued by it, and therefore perhaps does not call for any expression of surprise on the part of those interested in paving matters. If, however, we refer to the opinions entertained by the association ten or even five years ago we find a most remarkable change in sentiment. Ten years ago the officers of the organization considered it almost criminal to suggest the use of bituminous filler in brick pavements and even up to four or five years ago insisted that no brick pavement was a good pavement unless it had a portland cement filler. The pendulum has now swung to the other extreme and we find the same association preferring the asphalt filler and stating that only under special local conditions is the cement filler adaptable.

The association has not, we believe, gone on record as favoring bituminous concrete base instead of cement concrete, although such base is recommended in this year's specfications, at least for use under certain conditions.

We do not know what considerations have lead to this change of heart, but we have several times taken occasion to set forth at some length in PUBLIC WORKS the advantages of both non-rigid base and bituminous filler; one of these, which would appeal to the city engineers more than to the paving manufacturer, being the possibility of opening up the street at least two weeks earlier than would be practicable where a concrete base and cement filler are used, each of which should be given a week to set before traffic is allowed upon the pavement.

## Contract Standardizing Conference

There was recently held, in Washington, a conference of architects, contractors, engineers and others to consider whether something can be done to standardize and generally improve the whole basis of contract forms used in the construction industry where, heretofore, the variation of specifications and terms of agreement has been characterized as "an outstanding sore." Such an improvement of present practice and conditions was represented to make for the elimination of waste and lost motion and improvement of business practices throughout the whole of the United States.

The importance of the subject is indicated by the facts that Brigadier General R. C. Marshall, Jr., formerly chief of the construction division of the U. S. Army during the world war, and now general manager of the Associated General Contractors of America, has recently found through a survey of the situation, that there are today in common use throughout the construction industry more than 200 different forms of contract, none of which has yet been standardzed or made customary in any state or section of the country. This large number of different forms have been analyzed by expert engineers at the headquarters of the Associated General Contractors and they report that the differences are chiefly of wording rather than stipulation and that at least two-thirds of all the provisions of all the documents were common to all of them and might be included in a single contract form. It was found that the stipulations characteristic of building trades, railroads, waterworks and highway construction could be assembled for each of them in standard forms which, under the rules of General Conditions could be added to the single standard agreement form and thus provide a standard contract to cover all cases of construction in all fields, by selecting the proper General Conditions which might probably be reduced

to about six to cover the main subdivisions of construction wrok.

This plan together with a "tentative outline" was submitted for consideration to the American Association of State Highway Officials, American Engineering Council, American Institute of Architects, American Railway Engineering Association, American Society of Civil Engineers, American Waterworks Association, Associated General Contractors of America, National Association of Builders Exchanges, and the Western Society of Engineers.

All made favorable responses and appointed representatives to come to Washington to constitute a conference on the subject and proceed with the drafting of a tentative form of contract which could later be offically submitted by the conference to its constituting bodies for criticism, amendments, and ultimate ratification.

The conference met in the assembly room of the Department of Commerce building, in Washington, December 15 and 16. The aim of the conference in beginning work on this difficult task was to achieve the following advantages for the entire construction industry and all its affiliations: Less expenditure and legal service. Less duplication of work in the professions. Elimination of disputes. Better safeguard for owners and increased public confidence. An improved standard of construction service throughout the country.

Officers of the Conference were elected as follows: Chairman, Onward Bates, Chicago; Vice-Chairman, J. W. Cowper, Buffalo; Secretary, W. P. Christie of Washington, D. C. General R. C. Marshall, Jr., and William B. King, representing respectively the Associated General Contractors and the American Bar Association were elected members of the conference. Other delegates were: W. A. Rogers, Chicago; E. W. Reaugh, Cleveland; A. P. Davis for the Engineering Counci,; J. Waldo Smith, New York City; William S. Parker, Boston; H. K. Bishop, Washington; H. Eltinge Breed and W. D. Faucette.

The final session of the conference was devoted to a detailed study of clauses which could be approved for incorporation in the standard contract "agreement," the members voting on each topic separately until a definite list of topics had been made which seemed acceptable for universal use.

It was the concensus of opinion that such a universal document could be achieved, and its scope or length would have to be determined after prolonged considerartion of each topic in detail.

It was also decided that sub-committees should later be appointed in each phase of the industry to draw up the standard form of "general conditions" (one for the railroads; one for the builders; etc.) which would complement the general "agreement" according to the nature of the job.

Thus the general principles of the universal contract were fixed, and a committee consisting of General Marshall for the constructors, W. S. Parker for the architects and W. D. Faucette for the Railway Engineers, was appointed to write out the document in tentative form for correction and approval by transmitted officially to the various societies and organizations interested for further consideration and ultimate adoption.

## Lackawanna Trail

The contract for 6½ miles of concrete highway pavement on the Lackawanna Trail between Nickelson and Foster, Pennsylvania in the State Highway Systme was awarded for $420,000 to the Awixa Corp., Islip, N. Y., who commenced operations June 16, 1921 and expect to complete the work within one year from that date. The road, 20- feet wide from 6 to 8 inches in thickness, is constructed on a new alignment in hilly country with maximum grade with 3½ percent grades and curves of 6 degrees. It involves the excavation of about 25,000 yards of earth and 25,000 yards of rock, a maximum haul of about ½ mile. The total amount of concrete required is about 35,000 yards, besides 1,500 yards of culverts. Aggregate is received by rail and unloaded by a crane and immediately delivered to the mixer without intermediate storage. It is taken in automobile trucks to the 21-A Koehring paving machine and to the Koehring Dandy Mixer for culvert work. The maximum progress has been so far 1,096 square yards in eight hours and the total force of 135 men with a weekly payroll of about $4,000.

Grading was done with Bucyrus steam shovels, served with four 4-yard trucks and water was pumped by the contractor's C. H. & E. pumps delivering through a maximum of 4 miles of pipe.

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## Decision in the Hetch Hetchy Suit.

(*From the December number of "The City," the monthly publication of the San Francisco Bureau of Governmental Research.*)

The right of citizens to inspect municipal business, not after it is settled, but while it is in the formative stage when criticism may be of real value, is at last definitely established. Last week the Supreme Court of California, in the Bureau's Hetch Hetchy suit against the city and county of San Francisco, handed down a decision ordering that all the records and data sought by the bureau in its action be made available to it for inspection. This is of far-reaching importance, as it settles in favor of the taxpayers the right of citizens to take an active part in their own affairs as administered by municipal officials.

The bureau in 1917, wishing to make an independent and accurate study of the Hetch Hetchy project, after informal, and later formal requests, was denied access by the city engineer to certain information relative to diamond drill borings, dam location plans, cost estimates, stream flow studies, etc. The city engineer's recommendation that the bureau be denied the requested information and opportunity to scrutinize records, estimates, etc., was supported by the mayor and upheld by the Board of Supervisors after formal hearing.

Two suits were then filed, one by the bureau in its own name and one by the secretary of the bureau, as a taxpayer. A trial was had before Judge Crothers, and the Court handed down a decision upholding in part the bureau's contentions, but deciding that certain kinds of data need not be opened to inspection. The city appealed from this decision, and the bureau appealed from that part exempting "working papers," inasmuch as all data and investigations that had not been formally filed with the Board of Public Works by the city engineer, and all data turned over to the city attorney for his

information in trial cases would have been exempt from citizen scrutiny if the decision were permitted to stand. (The city contented that working reports and other data did not become public documents until they had been transmitted in a formal report from the city engineer to the Board of Public Works, and further, that all data, when turned over to the city attorney, became "confidential" in character.)

In the meantime, the bureau and the city engineer were in conferences on many other matters; much of the data originally sought by the suit had been made available at various times to the bureau's representatives and to citizens generally, and specifications had been published and the contract let for construction of the dam. The suit was not dropped, however, because of the public-spirited desire to definitely establish the right of all citizens to have a knowledge of all public business, and not only such as a public official might choose to disclose or as might be disclosed in formal official reports.

This right is definitely established by last week's decision, which orders included within the writ of mandate for citizen inspection all preliminary estimates and details which form uncompleted data, even although such matter may not yet have been formally dignified by official sanction as public records; and further, that citizen inspection of records and "other matters" cannot be prevented on the ground that they are "confidential" by the circumstance of the city engineer's having communicated these to the city attorney.

## The Cost of Water Waste.

In his annual report for the year 1920, George G. Earl, general superintendent of the New Orleans Sewerage and Water Board, explains clearly the disadvantages to the taxpayers of waste of water, in this case caused partly, Mr. Earl believes, by the too low rates for water. This part of the report is as follows:

From 1915 to 1920, with only 20% increase in the number of premises served, the total water consumption has increased about 55%, having now reached an average daily rate of consumption for several months of 1920, of about 43,000,000 gallons per day, which is the safe capacity limit of the existing purification and pumping plants. This limit has been reached by 1920 because the total average consumption has gone to very nearly 100 gallons per day per capita; whereas, in 1915, every thing indicated that a total average consumption per day per capita of 80 gallons, would suffice. If this assumption had held, the necessity to increase the present plant capacity which exists today at 100 gallons consumption per capita for 400,000 people, would not have arisen until at 80 gallons consumption per capita, there were 500,000 people. In other words, the increased per capita total consumption is forcing increases in capacity in water and sewerage systems, which will cost several million dollars, over ten years before they would otherwise be necessary, and this increased and increasing consumption exists, to a considerable extent, because the existing water rate is too low to interest the public at all toward a reasonable care in the prevention of the waste of water. Water consumption dominates both the first cost and the cost of maintenance and operation of the water and sewerage systems. When the water and sewerage systems lack, as they do now, a safe surplus capacity beyond that required to meet the frequent demands which are made upon them, the tax payer who is already paying out of taxes the interest on the outstanding debt against them, must pay in addition the cost of all necessary increases in capacity. Directly or indirectly, every one is a tax payer, and generally every indirect payment is greater by a toll exacted enroute than the direct payment would be, so that water rates which are too low to interest consumers in water waste prevention and results in the necessity for the expenditure of millions of dollars for increases in capacity years before such expenditure would otherwise be necessary, actually cost through taxation far more than they save in rate payments. This is obvious because no one other than the tax payers and rent payers of New Orleans is ever going to pay any part of the cost of Water, Sewerage, or Drainage service. Every unnecessary increase of capacity in sewerage and water works systems required by waste of water and every unnecessary mile of water mains or sewers built ahead of a proper and healthy continuous and contiguous (but not crowded) growth of urban area to serve a too widely scattered population, is adding unnecessarily to the first cost and to depreciation and maintenance and operation costs, for which no one other than the New Orleans tax payers or New Orleans rent payers will pay.

## Algae Tastes in River Water

Tastes and odors in water supplies resulting from the presence of algae in reservoirs and lakes are more or less common, but similar conditions in river water have not often been noted. Rahway, N. J., has for some time experienced intermittently unpleasant odors and tastes which it thought might be contributed by the wastes from a chemical plant located higher up on the stream. At the request of the city, the state board of health, represented by Messrs. Daniels & Whitehead, investigated the conditions and reported thereon a few days ago.

In the report it was stated that uroglena as well as asterionella and other diatoms were found in the river water and that the cotton used in straining out these microscopic organisms in making the investigation had a peculiar fishy taste and odor similar to that complained of by the citizens in the public water supply, and the inspectors expressed as their opinion that these microscopic organisms were responsible for the tastes and odors. The following is quoted from their report:

"Although in the past there has been practically no trouble experienced with algae growths in the Rahway river, it is evident that periodical difficulty in that direction is liable to occur.

"The protozoa themselves are intercepted by the filters, but the oil from ruptured and dead organisms passes through to consumers and causes the odor. A very minute quantity of oil is sufficient to occasion a very pronounced odor. There is nothing unhealthful about it, but the odor and taste are extremely unpleasant and should, of course, be eliminated."

It was the opinion of the inspectors that it would be impossible to use copper sulphate in combatting the algae growth to be found in the river.

"The remedy must be obtained by constructional improvements at the plant, as the plankton organisms cannot be satisfactorily and finally eliminated by any reasonable method. This instance it is the uroglena, one of protozoa, and next time it may be algae or something else. It may disappear in a week or persist for months, unless temporary improvement is effected.

"Only a partial remedy is available, that of aeration of the raw water before going into the sedimentation basin. Waldo S. Coulter, bacteriologist, employed by city, has recommended the installation of this aerator following the algae troubles which occured about July 30, but according to him no action has been taken pending the report of the investigating committee on the present water supply."

In regard to aeration of the water Mr. Coulter stated a permanent aerator for five million gallons daily would cost $5,000 and a temporary unhoused wooden aerator could be erected for $1,000.

# Recent Legal Decisions

### INSUFFICIENT DESCRIPTION OF DEFECT IN STREET IN NOTICE OF CLAIM FOR INJURY

Requirements in statutes and ordinances regulating the method of presenting claims for injuries sustained through defects in streets are constitutional, reasonable and in the furtherance of justice. They are also mandatory; and a substantial compliance with the conditions imposed is a condition precedent to the maintenance of an action against a municipality. The Washington Supreme Court holds, Hanan v. City of Wenatchee, 201 Pac. 5, that the recital in a notice of claim, required by statute, that the injury was caused "by defective sidewalk located on the northerly side" of a named street, does not accurately describe a defect, and is not a compliance with the technical requirement of the statute. Nor is it a compliance with the purposes of the statute. Statutes of this sort have a number of purposes. One of these is to give the municipal officers notice of the nature of the defect which caused the injury on which the claim is founded in order that they may pay or otherwise settle the claim before the municipality is mulct in costs. This right is denied them unless the particular defect is pointed out to them. It is a matter of common knowledge that many of the sidewalks in the municipalities are defective in some respects; but not all of these defects will give rise to a cause of action even though they cause an injury.

### EMPLOYEES OF RAILROAD USING CITY STREETS UNDER FRANCHISE DISQUALIFIED FOR CITY OFFICE UNDER KANSAS STATUTE

Where a railroad company uses certain streets and alleys in a city under ordinances granting it the right to occupy them with its tracks upon condition that it shall conform to certain requirements, including the keeping the track in good condition with respect to general travel, the paving of the track between the rails, and t he maintaining of a driveway and sidewalk for the public, the Kansas Supreme Court holds, State v. Grove, 201 Pac. 82, that one who is employed by such company as a boiler maker is disqualified to hold the office of city commissioner, under the Kansas statute providing that no employe of a railway corporation operating under a franchise granted by a city, or having any contract with it, shall hold any city office. The term "franchise" is used in this statute in a broad and general rather than a narrow and technical sense, and covers rights acquired under such ordinances, and the relations of the city and railway company under such ordinances are contractual.

### "COUNTY OFFICER" DEFINED

The California Supreme Court, in Coulter v. Pool, 201 Pac. 120, defines a "county officer" as a public officer who fills a position usually provided for in the organization of counties and county governments, and is selected by the political subdivision of the state called the "county" to represent that governmental unit, continously and as part of the regular and permanent administration of public power, in carrying out certain acts with the performance of which it is charged on behalf of the public.

### "SIDEWALK" AND "PAVEMENT" HELD NOT SYNONYMOUS

In a suit to restrain an assessment of property for street improvement purposes, the sole question was whether or not the terms "sidewalk" and "pavement," as used in the proviso of the city charter imposing an assessment for building or repairing "any sidewalk or pavement" are exact synonyms. The Oregon Supreme Court, James v. City of Newberg, 201 Pac. 212, holds that each word, as used in the statute, has a distinct meaning.

### STREET IMPROVEMENT ASSESSMENT NOT VOID BECAUSE PROPERTY NOT WITHIN DISTRICT IS BENEFITED

The California courts hold that the proceedings which form the basis of assessment liens for street improvements will not be considered void because all the property benefited by the improvement was not embraced within the district assessed for such work, since the question as to the limits of assessment districts in the matter of making such improvements is one that is committed solely to the discretion of the municipal body determining upon such improvement under the district plan. Larsen v. City and County of San Francisco, 182 Cal. 1. Stokes v. Watkinson (Cal.) 201 Pac. 134.

### NATURE OF HIGHWAY IMPROVEMENT FOR INDIANA VOTERS PETITIONING THEREFOR

The Indiana statutes as to the improvement of highways, Burns' Ann. St. 1914, §§7713, 7716, 7649, 7668, and Burns' Ann. St. Supp. 1918, §§7711a, 7712, 7719, make the questions what improvement shall be made, and whether along an existing highway or along the line of a new one laid out and established for that purpose, exclusively for determination by the qualified freeholders and voters of townships affected; jurisdiction is conferred by filing a petition signed by the required number of qualified freeholders and voters, and may be taken away by an adverse vote of the legal voters of the township, or, in the case of improvements not submitted to a vote, by the remonstrance of a sufficient number of freeholders and voters affected. And neither the viewers nor the board of commissioners have any power to lay out, establish, or construct any improvement except as petitioned for by a sufficient number of properly qualified freeholders who are voters. Cincinnati, I. & W. R. Co. v. Board of Comrs. of Fayette County, Indiana Supreme Court, 132 N. E. 406.

### PUBLIC UTILITIES' COMMISSION HAS NO JURISDICTION OVER DANGEROUS CONDITION OF STREET THROUGH LEAKING WATER MAIN

The Colorado Public Utilities Commission, dismissing for want of jurisdiction a complaint against leakage in a water main, Taylor v. City of Glenwood Springs, holds that the Commission has no jurisdiction as to the dangerous condition of a street caused by the leakage of water undermining the street and the holes excavated therein in the work of repairing the pipe line. It cannot order repairs or improvements in a water main except upon complaint of a patron of the utility that the leaks in the pipe line are responsible for an inadequate, insufficient, or impure supply of water.

# NEWS OF THE SOCIETIES

## CALENDAR

**Jan. 4-14** — CLEVELAND, OHIO, BUILDING EXPOSITION. Municipal auditorium, Cleveland, Ohio.

**Jan. 5-6** — AMERICAN ENGINEERING COUNCIL, FEDERATED AMERICAN ENGINEERING SOCIETIES. Annual meeting, Washington, D. C.

**Jan. 6**—DETROIT ENGINEERING SOCIETY. Secretary, O. H. Dawson.

**Jan. 9** — MEMPHIS ENGINEERS' CLUB. Memphis, Tenn. Secretary, A. S. Fry, Memphis.

**Jan. 10**—ENGINEERING SOCIETY OF BUFFALO. Iroquois Hotel, Buffalo. Secretary, N. L. Nussbaumer, 80 W. Genesee St., Buffalo.

**Jan. 12** — ENGINEERS' CLUB OF DES MOINES. Des Moines, Ia.

**Jan. 12-14**—HIGHWAY ENGINEERS' ASSOCIATION. Baltimore Hotel, Kansas City, Mo. Secretary, C. W. Brown, State Hgwy. Dept., Jefferson City, Mo.

**Jan. 13** — ENGINEERS' CLUB OF SEATTLE. Seattle, Wash. Secretary, Lyman T. Banks, 916 L. C. Smith Bldg., Seattle.

**Jan. 14**—LOUISIANA ENGINEERING SOCIETY. New Orleans, La.

**Jan. 17-19** — IOWA ENGINEERING SOCIETY. 34th annual meeting. Sioux City. Secretary—Lloyd A. Canfield, Des Moines, Ia.

**Jan. 17-19**—ASSOCIATED GENERAL CONTRACTORS. 3rd annual meeting. Hotel Winton, Cleveland Ohio.

**Jan. 17-19**—ASSOCIATED BUILDING CONTRACTORS OF ILLINOIS. Chicago, Ill.

**Jan. 17-20**—ASSOCIATION OF CANADIAN BUILDING AND CONSTRUCTION INDUSTRIES. 4th annual conference. Royal Connaught Hotel, Hamilton.

**Jan. 17-20** — AMERICAN ROAD BUILDERS' ASSOCIATION. Annual Convention and good roads show. Chicago, Ill.

**Jan. 18-19**—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting. New York City.

**Jan. 18**—ASSOCIATED ENGINEERING SOCIETIES OF ST. LOUIS. Annual meeting. Secretary, Miss C. B. Adams, 3817 Olive St., St. Louis.

**Jan. 18**—SIOUX CITY A. A. E. Joint meeting with the Iowa Engineering Society convention. Sioux City, Ia.

**Jan. 20**—BRIDGE BUILDERS' AND STRUCTURAL SOCIETY. New York City.

**Jan. 24-26**—ILLINOIS SOCIETY OF ENGINEERING. 37th annual meeting. Decatur, Ill.

**Jan. 27** — NEW YORK SECTION, AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Engineering Societies' Bldg., New York City. Secretary—G. I. Rhodes, 115 Broadway, New York City.

**Jan. 27-28** — WESTERN PAVING BRICK MANUFACTURERS' ASSOCIATION. Kansas City, Mo.

**Jan. 27-28**—ARKANSAS CHAPTER, A. A. E. Little oRck, Ark.

**Jan. 30**—SOCIETY OF AMERICAN MILITARY ENGINEERS. Washington, D. C.

**Feb. 13-16**—AMERICAN CONCRETE INSTITUTE. Annual Convention Cleveland. Secretary Harvey Whipple, 814 New Telegraph Bldg., Detroit, Mich.

**Feb. 12-17** — CONFERENCE OF HIGHWAY ENGINEERING, 8th annual conference. University of Michigan, Ann Arbor, Mich.

**Feb. 15-17**—AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Tenth midwinter convention. Engineering Societies' building, New York City.

**Feb. 21-23** — MINNESOTA FEDERATION OF ARCHITECTS AND THE MINNESOTA SOCIETY OF CIVIL ENGINEERS. First annual convention Curtis Hotel, Minneapolis.

**Feb. 22**—AMERICAN BUILDING EXPOSITION. Municipal Auditorium, Cleveland, Ohio.

**Apr. 27-30**—BUILDING OFFICIALS' CONFERENCE. Apr. 27-28, Cleveland, O.; Apr. 29, Massillon, O.; Apr. 30, Youngstown, O.

**May 15-19** — AMERICAN WATERWORKS ASSOCIATION. Annual convention. Philadelphia, Pa.

## DETROIT ENGINEERING SOCIETY

On December 16th in the Board of Commerce auditorium, Detroit, was held a meeting of the Associated Technical Societies of Detroit, sponsored by the Michigan Chapter of the American Society of Heating and Ventilating Engineers. Prof. J. D. Hoffman, head of the mechanical engineering department of Purdue University, addressed the meeting on "Benefits Derived Through Co-operation."

## ENGINEERS' SOCIETY OF MILWAUKEE

A meeting of the Engineers' Society of Milwaukee was held on December 21st at the Milwaukee Athletic Club. An address on "How Better Lighting Interests You," was given by W. T. Blackwell, manager of the Commercial Engineering Dept., Westinghouse Lamp Co., under the auspices of the Milwaukee branch of the Illuminating Engineering Society in conjunction with the Milwauke Better Lighting Campaign.

## KANSAS ENGINEERING SOCIETY

The annual meeting of the Kansas Engineering Society was held on December 22-23 at Hutchinson, Kansas, comprising business sessions and sessions for the presentation of professional papers. At the evening session on the 22nd addresses were presented by P. F. Walker as president of the society and by P. J. Ruckel of Hutchinson, Kansas, on "Industrial Activities and Matters of General Engineering Interest in Central and Western Kansas." On the afternoon of the same day a dinner was given the society by the Hutchinson Engineers' Club. At all the various sessions, conservation and the public service character of engineering work was stressed.

## BOSTON SOCIETY OF CIVIL ENGINEERS

A special meeting of the Boston Society of Civil Engineers was held at Tremont Temple at 7.45 p. m., December 28th for discussion on tentative specifications for concrete and reinforced concrete prepared by a joint committee from the American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering Association and the Portland Concrete Association. The discussion was opened by Leonard C. Wason.

## ENGINEERS' CLUB OF THE LEHIGH VALLEY

The Engineers' Club of the Lehigh Valley has elected as president W. O. Hearsey, division superintendent of the Bethlehem Steel Co., and as manager W. M. Kelsey, general superintendent of the New Jersey Zinc Co., Palmerton, Pa.

## CONFERENCE ON CONSTRUCTION CONTRACTS

Secretary of Commerce Hoover opened a conference of constructors, architects and engineers in the Assembly Room of the Department of Commerce, Thursday morning, December 15, to consider the adoption of standard contract forms for all classes of construction work. The meeting was called to consider the suggestion of the Hoover Report on the Elimination of Waste in the Building Industry, that present contract forms need revision.

The representatives of important organizations delegated to attend the conference included Wm. Stanley Parker of Boston, Secretary, American Institute of Architects; W. D. Faucette of Norfolk, Va., Chief Engineer, Seaboard Air Line, representing the American Railway Engineering Association; H. Eltinge Breed of New York, representing the American Society of Civil Engineers; J. Waldo Smith, Chief Engineer, New York Board of Water Supply, representing the American Water Works Association; A. P. Davis, Director, U. S. Reclamation Service, representing the American Engineering Council; Mr. Onward Bates, Bates & Rogers Construction Co., Chicago, Ill., representing the Western Society of Engineers; J. W. Cowper, President, John W. Cowper Co., Buffalo, N. Y., representing the Associated General Contractors of America; E. W. Reaugh, President, Reaugh Construction Co., Cleveland, N. Y., representing the National Association of Builders' Exchanges.

The purpose of the conference, as set forth in a memorandum accompanying the letter of invitation to the several associations represented, was to select the general principles applicable to all kinds of construction, and the special provisions complementary thereto but applicable only to individual classes of work, and from these (1) to create a Universal Document which will contain standard provisions for all classes of construction work and (2) to establish individual standard contract forms for each type of construction, such as have been developed for buildings by the American Institute of Architects and for railroad construction by the American Railway Engineering Association.

Itis hoped, that this will result in:

(1) Less expenditure for legal services in drawing proper contracts, and the elimination of disputes over contracts already drawn.

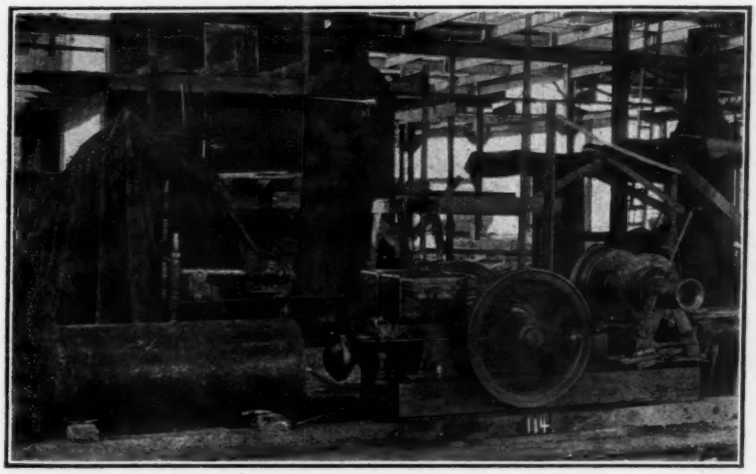
(2) Less duplication of work in the professions attendant on construction.

(3) Better safeguard for owners and increased public confidence, and,

(4) An improved standard of construction service throughout the country.

# New Appliances

**Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations**



HOIST OPERATED BY ONE MAN. MOUNTED WITH AIR COMPRESSOR, ELIMINATES TWO MEN NECESSARY FOR STEAM HOIST AND COMPRESSOR IN BACKGROUND THAT IT WAS REPLACED

### O. K. AIR COMPRESSOR AND HOIST

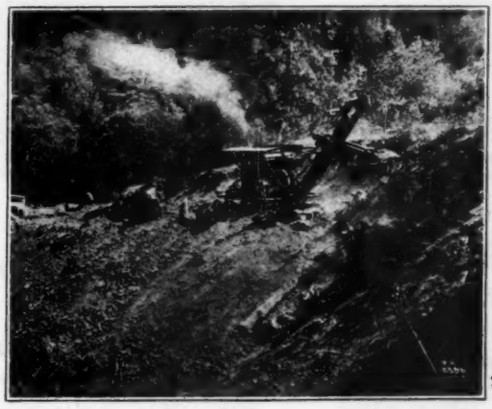
A combined air compressor and hoist, manufactured by the O. K. Clutch & Machinery Co., has been installed for the erection of bridges, structural steel work, tanks and other purposes by many of the large erection and construction firms.

They are very simple, durable and compact and effect a considerable economy of space, labor, power and transportation. The machine shown in the engraving has replaced the hoist and compressor shown in the background and its use eliminates the services of two men necessary for the operation of those separate units. The photograph was taken during the erection of the new factory of the Electric Storage Battery Co., Philadelphia, and shows equipment having 11 h.p., 4-cycle, single cylinder, horizontal type engine with 7¼-inch bore and 9-inch stroke, with capacity of 55 to 65 piston displacement per minute. It is direct connected to the engine by a double throw crank shaft. The hoist has a capacity of 2,200 pounds and the shipping weight of the unit mounted on steel channels, and without air tanks for trucks, is 5,400 pounds.

The first unit of the No. 3 compressor hoist was sold in 1916 and is still in operation giving excellent service on tank and tower work.

### P. & H. GASOLINE SHOVEL IN MOUNTAIN ROAD WORK

The accompanying illustration of the Bear Creek Road job shows an interesting application of a Pawling & Harnischfeger gasoline-driven power



P. & G. GASOLINE SHOVEL IN DANGEROUS MOUNTAIN ROAD WORK

shovel used by the contractor, C. Miles. This road work, 3,000 feet above sea level in the Santa Cruz Mountains was done at a figure 30 cents per cubic yard less than estimated by experienced excavating contractors and illustrates that the freedom of movement of a gasoline-driven shovel is an important factor. The work was done by excavating one side of the road and over-casting to form the other half. Because of requiring no water pipe line to the shovel, it may be operated in remote locations far aawy from source of supplies. The gasoline fuel used in comparatively small amount is easier to supply than coal, wood or crude oil. The corduroy traction gives the mobility needed to operate continuously, one man on the shovel having all movements of the bucket and machine under his control. The services of licensed engineer and firemen are not required.

## INDUSTRIAL NOTES

The thirteen Meyers Whaley Shoveling Machines now installed on the main tunnel of the Welch-Weterly Aqueduct for the San Francisco water supply are credited in the report of city engineer M. M. Shaughnessy, with unquestionably accounting for "the maximum progress with minimum cost for the work; the average cost of 2,915 feet of rock tunneling, exclusive of ooverhead and plant charge being $27.46 per lineal foot. for labor and material."

This tunnel, 11⅙ feet in diameter and 19 miles long, is blasted in sections 9 to 13 feet long, for which this drilling and shooting is done in 14 to 16 hours, simultaneous with the mucking. When executed by hand the mucking costs $109.50 and takes 19 to 21 hours; by machine it costs $33.00 and takes 3 to 5 hours, making a net saving per shaft of $76.50 and 16 hours time.

The H. W. Clark Company announces an increase in it's Capital Stock from $75,000.00 to $200,000.00 ($150,000.00 common and $50,000.00 seven per cent preferred cumulative).

A one hundred per cent stock dividend was declared out of the earnings of the Company, and some of it's common stock as well as some of the seven per cent cumulative stock is offered for sale.

## PERSONALS

Taylor, Alfred A., for several years general superintendent of the department of street cleaning of New York City, has been appointed commissioner to succeed John P. Leo, resignde.

Mack, Macklin has been appointed engineer for the city planning commission of Indianapolis.

Buck, C. D., formerly assistant to the chief engineer, Delaware state highway department, has been promoted to the position of chief engineer.

Sheridan, Lawrence V., an engineer of Dallas, Tex., has been appointed executive secretary of the Indianapolis planning commission.

Miles, E. L., of Lindsay, Ont., road superintendent for Victoria county, has been apopinted county engineer, and will hold both positions.

Haden, J. G., of Clay Center, Kansas, has been appointed water and light superintendent for Horton, Kansas, to succeed R. J. Wolfe, who recently resigned.

# New Catalogs of Interest to City and County Engineers, Superintendents of Water Works, Superintendents of Streets, Contractors and All Engaged in Public Works

**If you want any of these Catalogs, write the number on a postal, sign your name and address plainly, and mail it to PUBLIC WORKS, 243 W. 39th St., New York. The Catalogs will be sent to you promptly without charge or obligation**

### AUSTIN MOTOR SWEEPER

229. Austin-Western Road Machinery Co., 2218 Market St., Philadelphia, Pa. Catalog G, 9 x 12 inch, 20 pages, illustrated, heavy paper, printed in colors. Describes improved 4-wheel type Austin Motor Sweeper, illustrated with photographs of actual standard machines, taken before shipment or in operation and by accurate line drawings made by tracing photographs of the parts shown. Without damaging the pavement the machine will pick up dirt, elevates it to the hopper, carries it to dumping point and discharges it, eliminating, without extra cost or service, several different kinds of labor and expense items required under other street cleaning methods. The catalog illustrates brooms, elevators, water systems, chassis, and dirt container. The entire apparatus can be easily handled by a single man competent for truck driving.

### PUMPING MACHINERY

230. Advance Pump & Compressor Co., Battle Creek, Mich., bulletins 201, 202 and 204 to 220 inclusive, fastened in adjustable stiff paper covers. Descriptions, specifications and illustrations of centrifugal and plunger steam, power pumps for boiler heating, water works, irrigation and other purposes.

### BUTT-JOINTS NESTABLE CULVERTS

231. Chattanooga Road Machinery Co., Chattanooga, Tenn. 6 x 9 in., 20 pages illustrated descriptions of culverts made with semi-cylindrical sections of corrugated steel keyed together on longitudinal reinforcing ribs.

### BUCYRUS CLASS-72 TRENCH EXCAVATOR

232. Bucyrus Co., S. Milwaukee, Wis. Bulletin T-1002, describing Bucyrus Class-72 Trench Excavator with capacity for digging trenches in hard soil up to 72 inches wide and 20 feet deep, mounted on caterpillar traction and built with shovel type of construction to insure great strength and durability.

### SMITH MIXERS

233. "On the Job with Smith Paving Mixers" is the title of a new Catalog (No. 409-B), issued by The T. L. Smith Co., 1125 32d Street, Milwaukee, Wis. Photographs taken on various jobs throughout the country of all sizes and types of Smith Paving Mixers, are featured, and also illustrate the various types of auxiliary equipment used by road contractors—industrial railway and batch boxes with paver derrick, dump body trucks, automatic loaders, wheel barrow loading, etc.

Mechanical points of particular interest in Smith Papers are shown by means of actual photos. Copies of this new catalog 409-B will be gladly sent free on request.

### LAND DREDGES

234. Bay City Dredge Works, Bay City, Mich., catalog B, 10 x 6½ in., 78 pages, illustrated, embossed heavy paper covers, halftone engravings and descriptions of special features of dredges of the crawler, walking, track and floating types and data of work executed under unusual conditions, road work, and highway excavations, sewer tile and ditch excavations

### STEEL SASH

235. Truscon Steel Co., Youngstown, O. 8½ x 11 in., 80 pages, illustrated, showing detailed drawings and photographs, together with specifications and descriptions of the features of steel side wall sash for counterbalancing—continuous sash, mechanical operators, standard and special partitions and channel and tubular doors.

### HYDRAULIC AND SANITARY EQUIPMENT

236. The Sanitation Corp., 165 Bdwy, New York City. Bulletin G-6, 8 x 10½ inches, 40 pages, illustrated descriptions of sanitation—Geiger gate, valves and control apparatus, Olier automatic pumping machinery and ejectors, sanitation-Wuurl rapid sand filters and Larner-Johnson valves.

### HOISTING MACHINERY

237. Catalog 24 of Street Bros. Machine Works describes and illustrates a large line of standard steam and electric hoisting machinery, including cableway engines, cargo hoists, derricks for all purposes, dredging engines, excavating machinery, swinging engines, windlasses, drill frame hoists and many other special appliances.

### WELLER STORAGE PLANTS

238. Weller Manufacturing Company, Chicago, bulletin 105, 7½x10 inches, 32 pages, illustrations and descriptions of unit systems steel bins for storage for large or small quantities of sand, gravel, broken stone, coal and other materials. Crushing, elevating, conveying, screening and washing plants, cement unloaders, car unloaders and car fillers.

### HEATING AND STORING TANKS

239. Walter E. Mills Contractors' Equipment Co., 1222-23 Vol Street, Life Building, Chattanooga, Tenn. Bulletin illustrating construction and equipment of asphalt cement tanks fitted with steam chamber and steam core to maintain material at working temperature. Capacities of tanks suited to requirements of job and to promote saving of time, fuel, work and material, also manufacturers of plain tanks for storage of fuel oil.

### POWER DRIVEN TRIPLEX PUMPS

240. C. H. & E. Manufacturing Co., Milwaukee, Wis. Illustrated bulletin describing single indelivering large quantities of water a long distance under pressure for road making purposes. Duplicate pumps installed on steel trucks afford portability and reserve for accident.

### AN EFFIECIENT HOLT TRACTOR

241. Heil Company, Milwaukee, Wis. tor, used by Lane & Maloney, to serve a large Russell Grader has been operated 10 hours a day for 90 days without any expense for repairs and from August 25th to September 25th moved 29,975 yards of dirt at the same time that 18 mules averaged about 1,000 yards of dirt per month.

### COST OF TRACTOR SERVICE FOR ROAD GRADING

242. Atlas Valve Co., 282 South St., Threshing Machine Co. were satisfactorily used on road grading contracts by W. A. Kettlewell, Iowa City, Iowa, who writes that in very light sand the tractor loaded a Maney wheeler with a

### MANHOLE COVERS

243. Wm. Dee Co., 30 No. LaSalle St., Chicago, Catalog No. 8, 3½ x 6¼ in., 32 pages. Chiefly descriptive of standard manhole castings and covers, gratings, gutter passages, inlets, liner plates and grate bars. Also notice of Harvey motor trucks.

### ROAD REPAIR OUTFITS

244. H. P. Andressen & Co., 1261 No. Clark St., Chicago, Ill. Description of a complete portable outfit for economical and effective road maintenance, designed for quick and complete repair of asphalt, bituminousu concrete, cement concrete, brick, or waterbound and asphalt macadam pavement, providing all materials, tools and equipment in a single outfit.

### IRON AND WIRE WORKS

245. E. T. Barnum Iron & Wire Works, Detroit, Mich. Catalog 570, 7 x 10-inch, 66 pages, illustrated.

STANDARD
ASPHALT
BINDER B
*For Penetration Work*

Atlantic Ave., Swampscott, Mass., after application of Standard Macadam Asphalt Binder B, 1½ gals. to the sq. yard by three SOCONY Asphalt Sprayers, full width—27 feet, at one time.

SOCONY
REG. U.S. PAT. OFF.
ASPHALTS AND ROAD OILS
STANDARD OIL CO. OF NEW YORK

## *Standard Asphalt Products*

Standard Asphalt Binder A *for surface treatment.*

Standard Asphalt Binder B *for penetration work.*

Standard Asphalt Binder C *for the mixing method.*

Standard Refined Mexican Asphalt *for sheet and asphalt paving.*

Standard Asphalt Joint Fillers *for brick or block pavements.*

Standard Paving Flux, Standard Bridge Asphalt and Preserving Oils.

*Specifications and all other particulars furnished on request*

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Maintenance Our Specialty
HEADLEY GOOD ROADS CO.
Franklin Trust Building
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ASPHALT AND ROAD OIL

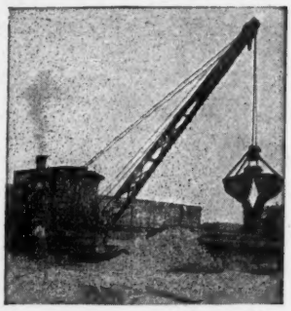
## A Service Tested Wire Rope

The use of HERCULES (Red-Strand) Wire Rope on heavy duty equipment is not an experiment, for its many years of actual service have demonstrated that it is a safe and economical rope for such conditions. Its one red-strand is our guarantee of constant quality.

Established 1857

A. LESCHEN & SONS ROPE CO.
St. Louis, Mo.
New York, Chicago, Denver, San Francisco

## O. S. DEPENDABLE



**Locomotive Cranes, Clam Shell and Orange Peel Buckets** are equipped with various devices for handling materials

*Catalog No. 18 is interesting and mailed upon application*

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Creosoted Wood Block, Conduit, Cross-Arms, Anchor Blocks, Poles, Cross-Ties, Piling, Wharf Timbers, Bridge Timbers, Lumber, etc., Water Pipe, Steam Pipe Casings, Liquor Log.

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Factory: Portsmouth, Virginia

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Street and Traffic Signs

—are the first things a stranger looks for when he arrives in town. First impressions are lasting—welcome visitors to your city with

"ING-RICH" PORCELAIN ENAMELED IRON SIGNS

Made of porcelain fused into a sheet steel base, "Ing-Rich" Signs are exceedingly durable as well as attractive. They are guaranteed for ten years, and for a much longer period than that they will retain their brilliancy. Made in any combination of colors.

Ingram Richardson Manufacturing Co.
Beaver Falls, Pa.

REGISTERED ACME TRADE MARK.

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This type of screener has proven its efficiency in point of economy, power and saving in labor. Requires a few minutes only for one man to put in or take out of operation.

Continuous bucket loading elevator. This plant can be used for unloading stone, gravel, sand or coal, simply by removing screen.

Indispensable for road contractors, who value time in loading.

We also manufacture brushes, screens, bins, elevators, graders, road rollers, unloading plants, etc.

Catalog showing full line on request.

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FRANKFORT, N. Y.

SAVES POWER and LABOR

# ASPHALT PAVING PLANTS ALL KINDS

PORTABLE DRYERS
PORTABLE KETTLES
FIRE WAGONS, ETC.

THE HETHERINGTON PLANTS

# HETHERINGTON & BERNER

INDIANAPOLIS, INDIANA, U. S. A.

**A Frozen Hydrant—Needless Fire Damage**

Frozen hydrants and water services are quickly thawed by Ross Thawing Device. This remarkable device consists of a jacket tank surrounding a series of steam coils. It operates on the flash boiler principle. It produces steam at the nozzle twenty seconds after the flame is lighted. By forcing water from the tank into the red hot coils, by means of a hand pump, either "wet" or "superheated" steam can be secured. "Superheated' steam will thaw quicker than any other known agent. Heat is furnished by standard Presto-Lite Acetylene Tank which is carried as part of the outfit.

Ready for operation, the Ross Thawing Device is 25 inches tall, weighs but 135 pounds. Base measures 28 x 12 inches. Reduce the number of fire dangers winter holds by installing Ross Thawing Devices. Simple, portable and efficient. For Fire and Water Departments.

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For Rolling Asphalt Use an Erie Tandem Paving Roller

Having its front and rear wheels exactly the same width, its weight placed principally on the large roll and its steering wheel divided with sections, this roller will prove a money-maker for any contractor who constructs asphalt or brick pavements or low crowned macadam roads. Write for catalog.

Every Erie Roller is guaranteed for a period of five years against faulty material or imperfect workmanship of any kind.

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ERIE PENNSYLVANIA 3

## the job is done-on time

¶ One hundred cases out of one hundred you'll finish on time if we have anything to do with supplying the materials. ¶ Our plants, the largest and best equipped in Pennsylvania and Ohio, have a 100 car daily capacity of Sewer Pipe, Culvert Pipe, Wall Coping, Hollow Tile, Drain Tile, Fire Brick and Fire Clay. ¶ And all our attention is centered on supplying quality products at fair prices—on time. ¶ *Write or wire for prices.*

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*807 Westinghouse Bldg., Pittsburgh, Pa.*

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We make IMMEDIATE DELIVERIES. Wire us

**The Emerson Steam Vacuum Pump is**

self-contained, requiring no foundation, outside belting, shafting, or engine; self-priming and so simple that skilled attention is unnecessary.

Ability to handle solid matter and entrained air without stopping permits their use on work where other pumps are hopelessly inadequate. They will operate in any position.

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## "ROBINSON"
## Sewer Pipe
**You Buy "THE BEST"**
**We Give "ZIP" Service**
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10 Plants
110 Cars Per Day
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**PROMPT SHIPMENTS**

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NATIONAL Pipe is made Right—on new equipment—by use of special cores.
NATIONAL Pipe has smoothest inside finish—easiest to work.

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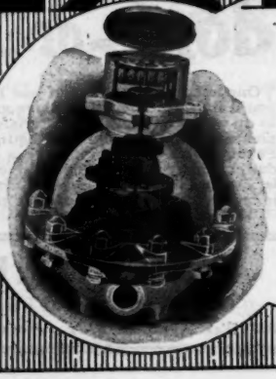
**For Big Buildings**



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are being installed more and more every day in every big hotel and office building in the country. It's because they are built to give long satisfactory service under exacting conditions that makes them so popular. Let us send you our bulletin telling the whole story.

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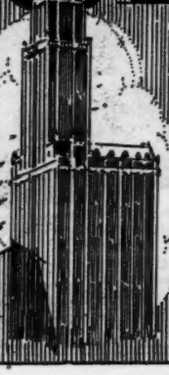


**Valve Inserting Machine**

With this machine you can insert new valves in existing lines under pressure, avoiding annoyance to consumers and also avoiding great fire risks.

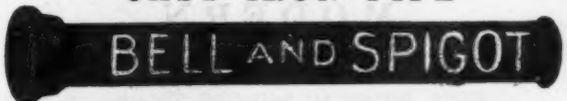
*Write for complete description of this and other water works specialties*

**The A. P. SMITH MFG. CO.**

East Orange, N. J.

Manufacturers of

**CAST IRON PIPE**




FOR—WATER—GAS—CULVERTS—SEWERS

Also Flexible Joint Pipe—Cylinders—Tubes, Milled and Plain Ends—High Pressure Fire Service Pipe—Special Castings—Flanged Castings a Specialty

*Quality and Service Guaranteed*

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Offices, 11 Broadway, N. Y.; 201 Devonshire St., Boston, Mass.
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**Shear, Flap and Butterfly Valves**

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Removes all refuse at from 3 to 5 miles an hour.

**ELIMINATES SPRINKLING and FLUSHING**

creates no dust, but sucks up that on streets. Write for record of tests, showing cost per 1,000 sq. yds. cleaned.

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**Meter Boxes, Meter Testing Machines and Accessories**

STANDARD EVERYWHERE

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**Mechanical Filtration for Municipal and Industrial Purposes**

**Swimming Pool Filters**

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**Water Meters for all Domestic and Industrial Services**

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Five minutes from the Pennsylvania and Grand Central Terminals, within easy access of the retail shopping district and surrounded by forty theatres.

**300 OUTSIDE ROOMS**

Each with private bath

**RATES—Single, $2.50 per Day Upward; Double, —$5.00 Upward.**

*Comfort of our guests our first consideration*

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SEWAGE TREATMENT

# *Sanitation R-W Process*

**The Age of Specialization**

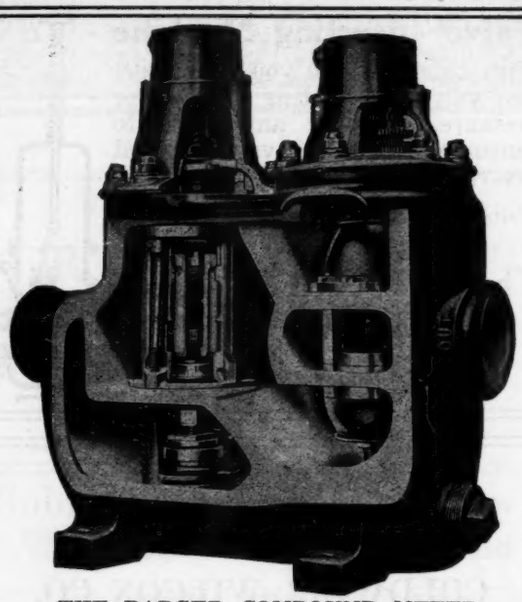
We Are Specialists in

**Mechanical Treatment of Sewage and Trade Wastes**

**THE SANITATION CORPORATION**

**Apparatus, Equipment and Complete Plants for Sewage Disposal**

**165 Broadway, New York City**



**THE BADGER COMPOUND METER**

combines the splendid Badger Disc and Badger Turbine meters. It registers accurately the smallest leak streams, as well as the large flow. The flow is regulated by a balanced COMPOUNDING VALVE of distinctive design. Only one meter is in operation at any time, and the registration is accurate at all flows.

**Badger Meters Are Made for Every Service**

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**THE BADGER METER MFG. CO.**

**841 30th Street Milwaukee, Wis.**

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## HERSEY DETECTOR METER

*The Hersey Detector Meter has been accepted for thirteen years in 3", 4", 6", 8", 10" and 12" sizes without any restrictions or conditions of any kind by every Insurance Company, Stock and Mutual, doing business in the United States, and by the Water Departments and Water Companies in more than 600 Cities and Towns for use on over 4,000 Fire Services protecting over $2,000,000,000. worth of Insured Property.*

HERSEY MANUFACTURING COMPANY

*BOSTON NEW YORK CHICAGO COLUMBUS, O PHILADELPHIA ATLANTA SAN FRANCISCO*

**Jaeger**
**A MIX A MINUTE**

**FOR THE "CITY JOB"**

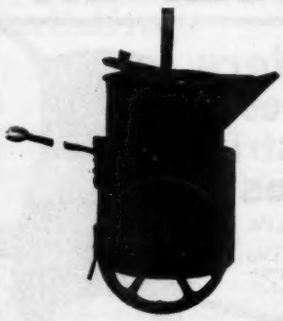
The costs for road and street making and maintenance have been reduced to a minimum in the hundreds of cities using this famous "MIX A MINUTE" mixer. It is used almost exclusively in New York, Ohio and many other states. **More speed, less labor, increased profits**—that's the Jaeger story. For every piece of city concrete work there's a Jaeger especially adapted to the job. Write for full facts today.

**The Jaeger Machine Company**

**400 Dublin Avenue Columbus, Ohio**

**CONNERY'S TAR AND ASPHALT HEATING KETTLES**

**NON-LEAKABLE—(Double Electric Welded)—"HELD BY THE WELD"**



These heaters and kettles are strong, durable and practical, and can be obtained in all sizes and styles.

**Immediate Shipment**

Write at once for complete catalog and prices.

**CONNERY & CO., Inc.**

**3900 Second Street**
**Philadelphia, Pa.**

# Advance Contract News

## ADVANCE INFORMATION — ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

## BIDS ASKED FOR

### STREETS AND ROADS

**Ala., Anniston** **Jan. 3**
For 26,000 sq. yds., st. pav., 26,000 lin, ft. curb and gutter—Robert L. Totten, Engr., Birmingham, Ala.

**Cal., Los Angeles** **9 a.m. Dec. 28**
For const. cement walks,—Bd. Education.

**Fla., Lake Wales** **2 p.m. Jan. 31**
For 175,000 sq. yds. st. paving,—M. M. Ebert, Town Clk.

**Ind., Hammond** **Dec. 30**
For grad. and pav. certain sts.,—Bd. Pub. Wks.

**Ind., Algona** **2 p.m., Jan. 16**
For Geo. Maxton hwy. impv., 29,784 ft. grad., drain and pav.—Frank C. Watkins, Steuben Co. Aud.

**Ind., Anderson** **10 a.m., Jan. 16**
For Cassellman L. Bruce, Henry Camp, Chas. P. Cather, Harry O'Connor and David B. Cole rds.—Henry P. Hardie, Co., Aud.

**Ind., Indianapolis** **10 a.m., Jan. 2**
For grad. and pav. certain sts.—Bd. Pub. Wks.

**Ind., Marion Co.** **10 a.m., Jan. 26**
For const. part of Churchman Pike, and conc. rd. on Worthwestern Ave.—Leo K. Fesler, Co. Aud.

**Ind., Petersburg** **Jan. 2**
For pav., gravel and stone surf. various rds.,—W. F. Risley, Co. Aud.

**Ia., Hampton** **1:30 a.m., Dec. 30**
For gravel surf. approx. 4.10 mi. rd. —Co. Aud.

**Kans., Hiawatha** **Jan. 5**
For grad. and culverts on Capitol hwy., xx 6.756 mi.,—E. C. L. Wagner, Kemper Bldg., Kansas City, Mo.

**Mich., Gladwin** **10 a. m., Jan. 6**
For shaping rd., const. drain. structures and surf. with gravel 5.516 mi. rd.—Frank R. Rogers, St. Hgwy. Comr.

**Mich., Howell** **1:30 p.m., Jan. 3**
For shaping rd. and const. drain. structures on 0.530 mi. rd.—Frank F. Rogers, St. Hgwy. Comr.

**Mich., Jackson** **1:30 p.m., Jan. 5**
For shap. rd., constr. drain structures and ruf. with gravel 4.646 mi. rd.—Frank F. Rogers, St. Hgwy Comr.

**N. Y. Albany** **1 p.m., Jan. 10**
For impv. about 45 mi. hgwy. in various counties—Herbert S. Sisson, St. Hgwy Comr.

**Tex., Georgetown** **11 a.m., Jan. 10**
For clear., grub., grad., drain. structures and surf., abt. 7.5 mi. Florence rd.—H. A. Hodges, Co. Aud.

**Tex., Jasper** **2:30 p.m., Jan. 10**
For const. 11.1 mi. rd. on St. Hgwy. 3—C. P. Hunter, Co. Engr.

**Wis., Madison** **11 a. m., Jan. 12**
For grad. and surf. east and west approaches to Sauk City bridge—Wis. Hgwy Comr.

### SEWERAGE

**Ill., Downers Grove** **7:30 p.m. Jan. 7**
For sewage disposal plant, etc.,—Bd. Trustees, San Dist.

**Mich., Detroit** **11 a.m., Dec. 30,**
For const. sewer and manholes—Jos. A. Martin, Comr., Dept. Pub. Wks.

**N. Y., Buffalo** **11 a.m. Dec. 27**
For const. 10-in tile sewer.—Dept. Pub. Wks.

### WATER SUPPLY

**Cal., Los Angeles** **3 p.m. Dec. 27**
For cast iron fittings,—Dept. Pub. Serv.

**Ga., Atlanta** **2:30 p.m. Jan. 31**
For const. filter plant and clear water reservoir,—J. N. Landers, Purchasing Agt.

**La., Abbeville** **Jan. 5**
For impr. water works and elec. lighting system, install, pumps, water line material, well-working equipment, reservoir, etc.,—Henry A. Mentz, Mgr., Magnolia, Miss.

**N. Y., Central Islip** **Jan. 11**
For artesian well for additional water supply at power plant,—State Hospital Com.

### BRIDGES

**Ia., Audubon** **2 p.m., Jan. 5**
For const. 2 brdiges—Co. Aud.

**Ia., Bedford** **1:30 p.m., Dec. 30**
For conts. 47 culverts and 4 bridges —Co. Aud.

**Ia., Clinton** **10 a. m., Jan. 19**
For const. bridges and culverts on Primary (Rd. Proj. No. 125—Co. Aud.

### LIGHTING AND POWER

**Cal., Los Angeles** **10 a.m. Dec. 27**
For lighting Pacific ave..—Bd. Pub. Wks.

**Ill., Springfield** **1 p.m. Dec. 27**
For storage tank and piping in power house,—Supervising Archt., Capitol bldg.

**Nebr., Ewing** **Feb. 16**
For const. bridge over Elk Horn River,—Geo. E. Johnson, State Engr.

**O., Orrville** **Jan. 7**
For erection of overhead transmission line—H. D. Hamlin, Clk., Bd. Trustees of Pub. Affairs.

### DRAINAGE AND IRRIGATION

**Ind., Fort Wayne** **1 p.m. Jan. 7**
For const. Salgy ditch, st. Joseph twp.,—Co. Surv.

### MISCELLANEOUS

**Ala., Mobile** **11 a.m. Jan. 20**
For dredge pontoon catamarans with discharge pipe, U. S. Engr. Office.

**N. Y., Manhattan** **2 p.m., Jan. 5**
For motor trucks—Henry H. Curran —Boro. Pres.

**O., Ironton** **Dec. 30**
For maintenance of county ditches for 1922—Co. Comrs.

**N. J. Newark**—Virgilio Spiniello, Orange N. J., awarded contract for Sec. 19 Garfield Wallington-Passaic Inter. sewer, $65,654.

**O. Wadsworth**—M. Abernathy, Akron O., awarded contract for San. sewer, $2,100.

**O. Akron**—D. E. Beattie Co., Akron, O., awarded contract for construction sewers, $63,877.

**Ont., Toronto** **noon Dec. 27**
For sand dryers for asphalt plant, T. L. Church, Chn., Bd. Control.

**Was., Tacoma** **2 p.m. Dec. 20**
For const. transit shed, pier No. 2, —Port Tacoma.

# Contracts Awarded

**Ala., Fort Payne**—J. P. Dicus, Burgaw, N. C., received contract from State Highway Department, Montgomery, at $159,325.92, to construct 17,758 miles of chert road. J. H. Mayer, Division Engineer, Birmingham.

**Ala., Mobile**—Hancock Brothers low bidder on building concrete road between Mobile and Chickasaw for Mobile County Commissioners; probably will receive contract. (Federal Aid Project.)

**Alabama**—State Hy. Dept., Montgomery, grading, briding and surfacing, local chert, 1,758 mi. road between Ft. Payne and Collinsville. De Kalb Co., to J. P. Dicus, Burgaw, N. C. 68,356 cu. yd. common excav., $0.26 per cu.yd. 17, 834 cu.yd. solid rock excav., $0.80, 45, 168 cu.yd. chert, 1 mi. haul, $0.63, 98, 604 cu.yd. chert ½ mi. additional haul. $0.175. 182,913 lb. reinforcing, $0.06, etc., total $159)326.

**Ark., Little Rock**—O. Kochtitzky, England, Ark., low bidder for clearing, grading and dredging work, $80,221.

**Cal. Santa Barbara**—Santa Barbara

Co., paving 29 mi. Surf-Lompoc Highway, asphaltic concrete, to Fairchild-Gilmore & Wilton Co., Pacific Electric Bldg., Los Angeles, $497,989.

**Cal., Santa Barbara**—Paving Haley Cota, Soledad and Casitas Sts., 1½ in. asphaltic concrete on 5 in. concrete, to Hunter & Richardson, 525 Haley St., $55,136.

**Cal., Los Angeles**—Paving with 6 in. concrete, curbing, guttering and sewers in Eaglerock Ave., to Fairchild-Gilmore-Wilton Co., Pacific Bldg., $40,410.

**Cal., Fresno**—Improving portions of Echo, Elizabeth and Dudley Sts., to Federal Constr. Co., Call Building, San Francisco, 166,418 sq. ft. grading, 142,822 sq.ft. 1½ in. Warrenite surface on 3½ in asphaltic concrete, 5,230 sq.ft. concrete gutter, 15,230 ft. concrete curb. 15,967 sq.ft. cement sidwalks, etc., $53,862; M St. between Kern and San Diego Sts., to Thompson Bros., 1514 H St. 193,118 sq.ft. grading, 180,555 sq.ft. -½ in. Warrenite surface on 5 in. concrete 12,060 sq.ft. concrete gutter, 6,647 lin. ft. concrete curb., etc., $70,144; San Joan St. between Bway. and M St. to California Road and Street Impvt. Co., Bank of Italy Bldg., 68,521 sq.ft. grading, 63,244 sq.ft. 1½ in Warrenite surface on 3½ in. asphaltic concrete, 5,075 sq.ft. concrete gutter and 2,598 lin.ft. concrete curb, $20,135; University and Moroa Aves. and Van Ness Blvd., to California Road and Street Impvt. Co., Bank of Italy Bldg., 105,468 sq.ft. grading, 81,499 sq.ft. 1½ in. Warrenite on 3½ in. asphaltic concrete, 3,291 sq.ft. concrete gutter, 3,878 ft. concrete curb. 6,652 ft. cement sidewalks, etc., $31,936.

**Cal., Calexico**—Grading and constructing curbs, sidewalks and crosswalks, to L. S. Atkinson, Chapman Bdg., Los Angeles, $269,496.

**Fla. Dunedin**—Grading, paving, curbing and guttering 1½ mi. Bway., Scotland, Virginia, Douglas, Lowden and Edgewater Sts., 20,500 sq.yd. asphalt block and 19,500 lin.ft. concrete curb. and gutter, to J. G. Yeats, Port Tampa, $68,000.

**Ia,. .Forest .City**—Winnebago Co., grading and gravel surfacing Sects. A and B, Primary Rd. Project 120, east and west through Thompson, 21,716 cu. yd. excav. and 22,255 cu.yd. gravel to W. Dutton, Boone, 19,404 cu. yd. excav. at $0.32 and 2,312 cu. yd. at $0.35 per cu. yd.; L. H. Marvill, Des Moines, 9,202 cu. yd. gravel, 1 mi. haul, $0.387 per cu. yd, 57,720 units, ½ mi. hual, $0.104, 17,160 cu. yd. 1 mi. haul, $0.38, 84,240 units ½ mi. haul, $0.10.

**Ill., East Moline**—Paving various sts., monolithic conc., asphalt or vitr. brk. to V. McLain Constr. Co., 922½ 15th Ave., $107,000.

**Ill., Chicago**—Bd. Local Impvts., paving 62nd, 61st, Parkside, Major, Massasoit, Menard, Mansfield, Mayfield and Mason Sts., to J. A. McGarry & Co., 189 West Madison St., $233,000.

**Illinois**—Dept. Pub. Wks. and Buildings. Div. Highways, Springfield, conc. paving 3.89 mi. Route 5, Sect. 6, Du Page Co., to C. C. Stewart & Co., Chicago, $82,760; 5.83 mi. Route 18. Sect. 9, DuPage Co, to A. Ward & Sons, Oak Glen, $124,360; 6.45 mi. Route 18, Sect. 10, DuPage Co., to Cook County, Contg. Co., 115 South Dearborn St., Chicago, $134,951.

**Ind., Greenfield**—B. D. McColly & Son., Renslaer, Ind., awarded contr. for Parks Crossley gravel Rd., $7,700; Wright & Wickard Rd., to R. P. Const. Co., Lebanon, Ind., $10,709; also C. A. Presnel Gravel Dd., $3,125; I. J. Baity Gravel Rd., $8,274; E. B. Cliff gravel Rd., $9,245; C. R. Milburn gravel Rd., $12,765 and H. E. Wilson Rd. to C. B. Huffmann, Warren Ind., $6,932.

**Ind. Clay County**—The Commissioners have let the following contracts: Homer Johnson road let to Meneely, Riggs & Brown, of Fontanet, Ind.; Daniel V. Lemay road let to the same bidders, who bid $11,285.99 on the Johnson road and $3,551.81 on the Lemay road. The roads are to be of stone and gravel.

**Minnesota**—State Hy: Com., St. Paul, paving 23 mi. State Project 27-21, between Morrison Co. Line and Sherburne Co .line, Benton Co., 241,000 s.yd. conc. to McCree, Moos & Co., 711 Merchants Natl. Bank Bldg., St Paul, $544,811.

Minn. St. Paul State Highway Com. awarded contracts as follows:

**Trunk Hgwy. No. 18**—Brainerd-Nichols, 4 miles gravel surfacing, to Clusian & Lidberg, Grand Rapids.

**Trunk Hgwy. No. 18**—Elk River-Zimmerman, 9.9 miles gravel surfacing, to Winston Brothers, Minneapolis.

**Trunk Hgwy. No. 23**—St. Cloud-Foley, 13.6 miles grading; Wilkins & Pettijohn, Park Paids grading, Independent Bridge Co., Minneapolis, bridge, $3,790; Great Northern Bridge Co., Minneapolis, bridge, Morris Construction Co., Morris, mono-culverts, Western Steel Products Co., Duluth, culvert pipe.

**Trunk Hgwy. No. 23**—Foley-Milaca, 15.6 miles grading; Wilkins & Pettijohn, Park Rapids, grading, Milaca Bridge Co., Milaca, bridge, and mono-culverts, Western Steel Products Co., Duluth, Culvert pipe.

**Trunk Hgwy. No. 28**—Sauk Center-Westport, 11.8 miles grading; Jurgenson Construction Co., Summit, S. D., grading, Morris Construction Co., Morris, mono-culverts, Klauer Manufacturing Co., Dubuque, Ia., culvert pipe.

**Trunk Hgwy. No. 28**—Swanville-Sauk Center, 16 miles gravel surfacing, S. Peterson, Minneapolis.

**Trunk Hgwy. No. 28**—Sauk Center eastward, 2.9 miles gravel surfacing, to Dobbleman & Rasmussen, Minneapolis.

**Trunk Hgwy. No. 28**—Browns Valley eastward, 23.4 miles gravel surfacing, to Scully and Connelly companies, as above.

**Trunk Hgwy. No. 28** — Near Graceville, 4 miles gravel surfacing, to Scully and Connell ycompanies, as above.

**Trunk Hgwy. No. 30**—Bijou-Waubun, 18 miles gravel surfacing, to Dobbleman & Rasmussen Minneapolis.

**Trunk Hgwy. No. 34**—Nevis through Akely, 15.4 miles gravel surfacing, to Dobbleman & Rasmussen, Minneapolis, at $18,790.38.

**Trunk Hgwy. No. 34**—Park Rapids-Nevis, 5.47 miles gravel surfacing, to Willkins & Pettijohn, Park Rapids, Minn.

**Trunk Hgwy. No. 35**—Bennettsville-Mille Lacs Lake, 8 miles gravel surfacing, to Campbell Equipment Co., Minneapolis.

**Trunk Hgwy. No. 35**—Aitkin-Bennettsville, 9.8 miles grading: Winston Brothers, Minneapolis, grading, Roach Construction Co., Gaylord, Mono-culverts, Western Steel Products Co., Duluth, culvert pipe.

**Trunk Hgwy. No. 35**—Grand Rapids-Pokegama Lake, 7.5 miles gravel surfacing, to Day Brothers, Minneapolis.

**Trunk Hgwy. No. 54**—Elbow Lake-Herman, 12 miles gravel surfacing, to Frank Georgen, Wheaton.

**Trunk Hgwy. No. 68**—Marshall-Tauton, 17 miles gravel surfacing, to F. C.

**Trunk Hgwy. No. 27**—St. Cloud-Roy-Mitchell & Co., Rochester.
alton, Paving, McCree, Moos & Co., St. Paul.

**Minn., Wadena**—Campbell Const. Co., Minneapolis awarded contr. for paving and curb, $49,719.

**Minn., Blue Earth**—Contracts awarded as follows: Reader & Gillman, Minneapolis, gravel surf. Div. B. & C.; W. J. Ryan, Blue Earth & E. E. Haight, Winnebago, Minn., Div. A; Guaranteed Gravel & Sand Co., Mankato, Material delivered at Delavan, Minn.

**N. Y., Syracuse**—Onondago Sidewalk Co. awarded contr. for sidewalk const., on Mariposa St., $691.

**N. Y. Syracuse**—Guy B. Dickinson awarded contr. for resurf. Burnet Ave, $2,601.

**N. Y., Syracuse**—F. J. Baker awarded contr. for resurf. Burnet Ave., $2,601.

**N. Y., Syracuse**—F. J. Baker, awarded contr. for repairing railroad strip on West Belden Ave., $1,535, and $3,826 respectively.

**N. Y., Syracuse**—J. H. Gallup awarded contr. for resurf. West Laurel St., $1,034.
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**N. Y., Brooklyn**—E. Riegelmann, boro pres., Boro Hall, opened bids Dec. 14, paving (1) Bay 28th St., (2) Clara St., (3) Dumont Ave., (4) East 7th St., (5) Lott Ave., (6) Newport St., (7) Rugby Rd., (8) Van Sinderin Ave., (9) West 28th St., (10) 20th Ave., (11) 21st Ave., (12) 48th St., (13) 58th St., (14) 67th St. From 3rd to 4th Aves., (15) 67th St. from Ft. Hamilton Parkway t o 10th Ave., (16) 75th St., (17) 77th St., (18) 78th St., (19) 90th St., repaving, (20) Ridge Blvd., grading sidewalk space, curbing and flagging (21) Division Pl., grading, curbing and laying sidewalks, (22) Van sinderen Ave., (23) 20th Ave., (24) 21st Ave., grading, curbing, laying and relaying sidewalks, (25) 20th Ave., from Borough Asphalt Co., 1301 Metropolitan Ave., (1) $4,522, (2) $7,194, (3) $2,077, (4) $7,635, (5) $2,586, (6) $4,698, (7) $1,452, (8) $5,639, (9) $7,592, (10) $7,060, (11) $6,323, (12) $7,066, (13) $6,055, (14) $6,159, (15) $3,769, (16) $11,519, (17) $6,223, (18) $6,769, (19) $6,344, (20) $26,396.

**Missouri**—State Hy. Dept. at div. of. Clayton, 7.0625 mi. Le May Ferry Rd., Federal Aid Project 80, St. Louis Co., 45,820 cu.yd. earth and 970 cu.yd. rock excav., 77,664 sq.yd. 1 course concrete pavement and 537.3 cu.yd. concrete masonry, etc, to Unit Constr. Co., Title Guaranty Bldg., St. Louis, $243,981; 6.07 mi. Gravois Rd., Federal Aid Project 78, St. Louis Co., 31,737 cu.yd. earth excav., 71,025 sq.yd. 1 course concrete pavement, 191.6 cu.yd. concrete masonry, etc., to Whitlow Constr. Co., Chas. City, Ia., $199,002

**Missouri**—State Hy. Dept. at div. office Bloomfield, 8,976 mi. road from Poplar Bluff to Cairo, Federal Aid Project 179, Stoddard Co., to N. Davis, Sikeston, 59,-811.

**North Carolina**—State Hy. Comm., Raleigh, grading and topeka paving on 5 in. conc. 10.59 mi. State Project 639, Iredell Co., to R. M. Hudson Co., Salisbury, $332,534, 8.84 mi. State Project 653, Mecklneburg Co., and 10.85 mi. State Project 622, Catawba Co., to Union Paving Co., 30th and Locusts Sts., Phila., $269,941 and $322,110 respectively; grading and concrete paving 1.57 mi. State Project. 655, Mecklenburg Co., to Speed-Parker Co., Norton Bldg., Louisville, Ky., $50,954, rein-con. culverts on above to Luten Bridge Co., 405 East 4th Ave., Knoxville, Tenn., $6,950; clearing and grading, 9.87 mi. State Project 456, Orange Co., to Crawford & Crawford, Mebane, $17,743, rein. con. bridges and culverts on above to N. L. Teer, Durham, $16,610; grading, rein. con. culverts and paving 6 in. concrete, 8.5 mi. State Project 632, Gaston Co., to Davis-Wilcox Constr. Co., Spencerville, O., $265,335.

**N. C. Marion**—McDowell Co., clearing, grading, etc., 7½ mi. road between Stone Mountain Church and Henderson Co. line. to Michaux Constr. Co., Albemarie, $44,878.

**N. J., Morristown**—Morris Co. grading road from Long Valley to Washington Twp., 25,861 cu.yd. excav., etc., to Gray Constr. Co., Franklin St., $33,-585

**N. Y., New York**—H. H. Curran, pres. Manhattan Boro., Municipal Bldg., repaving 52nd St., etc., to J. E. Gaffney, 438 East 91st St., $5,255; 76th St., etc., to Asphalt Constr. Co., 2197 Madison Ave., $32,098; curbing, recurbing, flagging, reflagging and paving Fairview Ave., etc., to P. J. Kearns Contg. Co., 2306 Creston Ave., $25,758; grading, curbing and flagging West 187th St., to M. Del Balso, 660 East 221st St., $67,-988.

**N. Y., Brooklyn**—E. Riegelmann, boro pres., Boro. Hall, repaving Nevins St., etc., to Leonard Paving Co., 233 Bway, New York, $7,949; Ridge Blvd, etc., to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., $31,346; Tillary St., etc., to R. J. Donovan, 618 Union St., $11,-420.

**N. Y., New York**—H. H. Curran, pres. Manhattan Boro., Municipal Bldg., widening and repaving 60th St. and repaving 69th St., etc., to Interboro Asphalt Co., 2306 Creston Ave., $12,702 and $11,-

814 respectively; repaving East 61st, East 52nd and East 76th Sts., to J. E. Gaffney, 438 East 91st St., $10,384, $23,450 and $6,091 respectively; Bleeker St. etc., to Brusstar Constr. Co., Inc., Harlem River and 150th St., $3,603.

**O. Alliance**—C. S. Beiry, Alliance O. awarded contr. grading, $2,134.

**O., Baker** — Copenhagen Bro., Portland, Ore., awarded contr. forf const. 13.2 mi. of grading bridge section, $107,692.

**Pa., Mantua** — Empire Const. Co., Phila. Pa., awarded contr. for conc. hgwy. $90,844.

**Pa., Harrisburg**—Ferguson & Wagner, Harrisburg, awarded conctr. for grading and paving North St.

**Pa., Harrisburg** — Stucker Bros., Const. Co., Harrisburg awarded contr. for laying out, grading and constr. new driveways.

**Pa., Philadelphia**—Mack Paving & Constr. Co., awarded contr. repairing Amber St., $10,900.

**Pa., Philadelphia** — Barber Asphalt Paving Co., awarded contract repairing Moutrose St., $2,800, Sixty-sixth St.; $7,100; Jefferson St., $3,000.

**Pa., Philadelphia**—George F. Dobbin awarded contr. grading and installing underdrainage system, $3,600.

**Tex., Rock Springs**—Edwards Co. grading 4 mi. Highway 4, 27 acres clearing, 8,981 cu.yd. roadway and 6,944 cu.yd. solid rock excav., 118.5 cu.yd. conc dips, 120 cu.yd. conc., 4,618 lb. reinforcing, to Tibbetts Constr. Co., Box 179, Mineral Wells, $28,916.

**Tex., Cuero**—DeWitt Co. opened bids Dec. 12 grading and gravel surfacing 10.31 mi. State Highway 39, Federal Aid Project 114, 34,824 cu.yd. borrow, 37,752 cu.yd. earth and 1,400 cu.yd. loose rock excav., 1,021.4 cu.yd. conc., 113,536 lb. reinforcing, 23,718 cu.yd. gravel surfacing to be furnished by county from Stahl, McElroy and Tom, Gonzales, $63,676; W. T. Hutto & Sons, Gonzales, $64,139; Miller Constr. Co., Port Lavaca $69,825.

**Wash., Olympia**—Hans Peterson Const. Co., 303 Alaska Bldg., Seattle Wash., lowest bidder for North Bank Hgwy, Cooks to Underwood, 3.09 mi., $2,850.

**Wash., Olympia** — Frank Morgan, Buckley, Wash., awarded contr. for Navy Yard Hgwy. Tidewater to Charleston, 2. 94 mi. $79,584.

**Wash., Olympia** — Reinseth & Co., 1917, Oakes Ave., Everett awarded contr. for Olympia Hgwy, Beaver to Forks, 9.07 min. $70,752.

**Wash., Olympia**—Pentille & Pellervo, Naselle Wash., awarded contr. for Ocean Beach Hgwy, Naselle to Johnson's Landing, $26,138.

**..Wash., Olympia**—Boyle H. Linsey, Stevenson, Wash., awarded contr. for North Bank Hgwy, Stevenson, West. $3,827.

**Wis., Madison**—W. E. Ule, Stevens Point awarded contr. for Pehtigo, Marinette Rd., grading and draining and surf. conc., $110,006.

**West Va., Charleston**—State Comr. awards contracts as follows:

Greenbrier county. Crawley, Clintonville road, three miles, Joe Carola, Ronceverte, $21,260.

Boone county: Danville, Peytona road, four and six-tenths miles, L. J. Chandler Co., Virgilinia, Va., $71,034.

Monongalia county: Morgantown-Point Marion road, five miles, Keeley Construction Co., Clarksburg, $68,998.71.

Jackson county: Ripley-Fairplain road, two miles, Keeley Construction Co., Clarksburg, $62,516.94.

Marshall county: Moundsville, Taylor's Ridge road, two miles, Stringer & Springer, Moundsville, $42,000.76.

Calhoun county: Grantsville-Arnoldsburg road, three miles, Cavin & Powers, Charleston, $43,825.63.

Grant county: Pendleton county line to Pansy road, four and four-tenths miles, M. N. Shilesly, Johnstown, Pa., $41,220.05.

Morgan county: Berkeley Springs-Hancock road, three and three-tenths miles, Souder Construction Co., Lancaster, Pa., $86,279.10.

Cabell and Wayne counties: Huntington,Hodges Creek road, four and five-tenths miles, Keeley Construction Co., Clarksburg, $129,962.

### SEWERAGE AND SANITATION

**Kans., Emporia** — C. H. Everett, Hutchinson, Kan., awarded contract for 6,950 ft. laterial sewer and 16 manholes, $9,237.

**Mass. Boston**—D. Vitiello 45 Clement ave. W. Roxbury awarded contract for sewer in W. Roxbury, $3,394.

**Mass. Boston**—A. Cefelo, 316 Belgrade ave. W. Roxbury awarded contract for sewerage works, $2,379.

**Minn. St. Paul**—Feyen Construction Co. awarded contract for construction sewer in Clifton St.


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1. Type A-A—Fibre centre non-oozing joint (Solid crown and sides).

2. Type B—Bituminous cellular fibre joint (75% Bitumen).

3. Type D—Cellular fibre joint (solid edges and sides, self expanding).

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# Work Contemplated

### STREETS & ROADS

**Ariz., Kingman**—Work is to be completed on 17 mile hill, Kingman-Oatman Highway. Estimated cost $45,000, Federal Government to furnish approximately $1.40 to $1 of county funds.

**Ala., Birmingham**—We are advised that Mr. W. E. Dickson, Commr. of Public Works, has asked the City Council for authority to purchase five dump trucks, one road roller with a scarifier attachment and one tractor.

**Calif., San Francisco**—Board of Public Works will call for bids for the improvement of streets in the Mission Terrace Tract, Sunnyside Section, San Francisco. Approximate cost, $100,000.

**Calif., Marysville**—The electorate of Marysville will vote on a bond issue of $80,000 for paving of street intersections and street improvement adjacent to the school properties and public parks or squares and a bond issue of $50,000 for improvement of Ellis Lake by removing the detritus therefrom.

**Col., Richmond**—Plans prepared for asphalt concrete surface and constructing cement sidewalks on Ohio St.

**Cal., San Luis Obispo**—Co. will call bids in January grading paving Ontario House-Aliva Rd.

**Col., Denver**—Plan paving 12 blocks alley paving Dist. 68, $30,850, 12 blks., 67, $20,621, both 16 and 20 ft. conc.

**Fla., Jacksonville**—Plans and specifications for surfacing Kings Road, a distance of about 4 miles, and constructing new bridge over Six Mile Creek, were adopted by Board of County Commrs. Surfacing of Edgewood Ave. is also proposed.

**Fla., Fort Meade**—This city contemplates street paving and the installation of an electric plant and "white way." Nat J. Patterson, Mayor.

**Ia., Clarinda**—Bids will be called for about January 15 by Gladys Heffin, City Clerk, for 38,000 sq. yd. paving. Henry Traxler, Engr.

**Ind., Indianapolis**—The State Highway Commission contemplates letting contract for from 100 to 125 miles highway, principally of hard surface type.

**Ill., Joliet**—Will County is assured that Lincoln Highway and Kankakee-Joliet road will be built soon and the Bluff road to Chicago may be completed. Federal aid of $3,246,281 appropriated.

**Ill., Joliet**—Grundy County Board of Supervisors adopted resolutions for improving macadam road 1 1-2 miles from end of state aid road in Wauponsee to south en dof river bridge, and for improvement of road east from Charles Woods' corner to Carbon Hill.

**Ill., Chicago**—The Rogers Park-Clark St. Business Men's Association, headed by Lyle D. Read, 1725 Jarvis Ave., Chicago, contemplates the installation of street lights between Farwell Ave. and Kenilworth Ave.

**Ill., Joliet**—Council approved a resolution to pave Center St. Estimated cost, $53,084.

**Ill., Rockford** — Will pave 40 miles streets brick and macadam, $120,000.

**Ill., Waukegan**—Plans being prepared to pave streets.

**Ill., La Grange**—Plans prepared for street paving in various streets. Edwin Hancock, 2047 Ogden Ave., Engrs.

**Ill., Durand** — Plans being prepared for paving. A. R. Carter, Rockford, Ill., Engr.

**Ill., Rockford** — Contemplated paving and resurfacing streets. B. C. Harvey, Engr.

**Ia., North English** — Village will build sewerage system at approximate cost of $30,000. H. R. Green, Cedar Rapids Savings Bank Bldg., Cedar Rapids, Iowa, engr.

**Ill., Mt. Vernon**—It is planned to

build 27,003 ft. intercepting sewers, settling tank, trickling filter, sludge bed and water supply. $180,000. A. C. Stanfield, city engineer.

**Ill., Maconet**—Plans being prepared for narrow gauge railroad. W. B. Holmes Stree, Engr.

**Ind. Shelbyville**—Bids being called about Jan. 4, for imp. of two rds.

**Ind., Indianapolis**—Board of Public Works adopted a resolution for paving 27th St.

**Mass., New Bedford**—Construction of three new sewers has been recommended.

**Mont., Boseman**—Bids were rejected by C. A. Spieth, City Clerk, Dec. 8th, and will be readvertised within the next six months for construction of conc. curbs and segments, sanitary sewer and paving.

**Mo., Wheaton**—Estimates of the cost for improving highway in Barry County near Wheaton will be prepared by H. P. Mobberty of Springfield, Division State Highway Engr., and have been forwarded to Missouri Highway Commission for approval. Bids will be asked for soon.

**Mich., Mackinac** Island — City of Mackinac Island voted to pave Main St. the coming summer and it is planned to improve the entrance to the city from the lake by removing old buildings around the docks and paving the runway to the docks. H. George D. Nutting, Consulting Engr., Grand Rapids, Mich.

**Mo., Kansas City**—Plans paving 59th St. to Meyer Boulevard.

**Mo., St. Joseph**—Plans prepared for paving $12,144.

**Mo., Neosha**—Bids for road work in Newton Co., Mo. Co. Ck., Neosho Co.

**Mo., Versailles**—Installation of sewer system is contemplated.

**Mo., Jackson**—Plans are being drawn up for sanitary sewerage system. About $100,000.

**Mich. Detroit**—Plans indeming and paving 1,000 ft. Madison Ave., sheet aspl. 8 in. conc., $35,000.

**Minn., Northfield**—Construction of sanitary and storm sewers is planned.

**N. C., Littleton**—Installation of sewerage system and improvement of various streets are planned. About $75,000. H. C. Smith, clerk.

**N. J., Jersey City**—Plans have been prepared for Fisk St. system, 13,400 lin. ft. 18-24 inch vitr., 4,255 lin. ft. 30-102 inch segment block, 50 lin. ft. 8 ft. 6-inch concrete and 97 lin. ft. 8 ft. 6-inch steel pipe, etc. $203,000. C. A. Van Keuren, City Hall, city engr.

**N. J., Trenton**—Contemplate paving four streets.

**N. J., Atlantic City**—Contemplate paving in Atlantic Co. A. H. Nelson, Engr., Guarantee Trust Bldg.

**N. J., Burlington**—City contemplates sidewalks and curbs.

**N. J., Camden**—Plans paving various streets and roads, $750,000. J. J. Alberston, Engr.

**N. C. Graham**—Alamance Co., plans grading and surf. 5. 93 mi., Kimesville Rd., $25,000. W. L. Spoon, Burlington, Engr.

**Nebr., Lincoln**—Bids were rejected by Dept. of Public Works, 4th floor, Brownell Blk., for construction of gravel surfacing and culverts on Kearney-Simon project, and for constructing ditch checks on Table Rock-Lewiston project. Also gravel surfacing on Overton-Cozad project.

**N. Y., North Tonawanda**—According to Supervisor Herman A. Gardei plans are being prepared for the construction of pavement on River Road, by state and county.

**N. Y., New York**—The Cohasset Realty Co. plans the development of property in Queens, known as Buckingham Park. The property and improvements, consisting of the opening of streets and laying of sidewalks, involves an expenditure of $150,000.

**N. Mex., Las Cruces**—Petition submitted to town board of trustees asking for the paving of 16 blocks in the business district of the city.

N. J., Trenton—Co-operation in paving South Broad St. is pledged by Trenton & Mercer County Traction Co.

**N. C., Marion**—Improvement and construction of roads is planned for McDowell County. County Commrs. sold $150,000 worth of bonds.

**N. J., Burlington**—Board of Freeholders, Burlington County, will readvertise for bids for the construction of bituminous asphalt paving.

**O, Shaker Heights**—Plans prepared for sidewalk const., $12,000.

**O. Wapakoneta**—Contemplates paving in Noble Mountains Imp., $15,000.

**O. Findlay**—Contemplate paving to cost, $70,000. Phil. Ballard, Engr.

**O, Dayton**—A. W. Smith, Vernon Ave., plans to constr. streets, sewers, and lay water mains in 70 acre track. Engr. not selected.

**O., Youngstown**—Ordinance amending the franchise permitting Ohio Telephone & Telegraph Co. the right to place its toll lines under ground was passed under suspension of rules by council. Ordinances were also passed for paving Broad alley, Point View Ave., and repaving Basin St.; for constructing sewer on Springdale Ave. Resolutions were passed for constructing sidewalks on west side of South Ave., on Smithfield St., on McCartney Road and on McGuffey St. Also for paving Mormion Ave., repaving Mahoning Ave., grading Sunshine Ave., paving Philadelphia Ave., Clarencedale Ave., sewer Connecticut Ave., paving Neilson Ave.

**O., Akron**—State board of health is considering demand of residents of Boston township that Akron be ordered to construct new $2,500,000 sewage disposal plant.

**Okla., Wilson**—City will expend $120,000 for improving sewer, water and electric light systems, etc.

**Tex., Amarillo**—It is intended to expend sum of $60,000 for extension to sanitary sewer system. The Mayor.

**O., Delphos**—Allen County Commrs. sold $100,000 in road bonds, insuring improvement of Harding Highway.

**O., Columbus**—State Highway Dept. considers the widening and repaving of Kinsman Road.

**O., Cleveland**—The 1922 state highway program at Columbus calls for reconstruction of Lake Road, for which $194,000 was appropriated; Brecksville Road will be widened; Akron Road will be widened and improved. Leon C. Herrick, State Highway Commr.

**O., Hamilton**—County Commrs. have authorized the County Surveyor to prepare an estimate of the cost of constructing Riverside drive.

**Okla., Poteau**—A proposed bond issue of $800,000 for construction of highways in Leflore County was sold by County Commissioners.

**Pa., Philadelphia**—The widening of Streets in downtown district is contemplated in this city.

**Tex., Linden**—Plans approved for two highways in Cass Co., gravel surf.

**Tex., Littlefield**—Plans being prepared for State Hgwy. No. 28, $75,000. Gravel surf.

**Tex., Big Springs**—Plan co. hgwy. in Howard Co., gravel surf and conc., $30,000.

**Tex., Beeville**—Fed. aid granted for hgwy. in Bee Co., $120,000.

**Tex., Cuero**—Plans approved for road in De Witt Co., $75,000.

**Tex., Georgetown**—Plan roads in Willson Co., gravel bid $40,634; Rd. No. 36 B. $41,000.

**Tex., Brenham**—Will soon call bids paving 26,960 sq. yds., in six streets, $50,000.

**Tex., Greeville**—Plans being prepared for surf. 12.5 mi. hgwy. 42, crushed stone, $176,494.

**Tex., Mason**—Plans grading and surf. 14.2 mi. state hgwy. 9, $63,500.

**Tex., Pittsburg**—Camp Co. preparing plans grading, gravel surf., and building structure 11mi., state hgwy., $128,432.

**Tex., Rock Springs**—Preparing plans grading 8 mi. rock surf. 2 mi., constr. bridges and culverts on state hgwy., $74,000.

**Tex., San Angelo**—$150,000 bonds voted for paving Main Sts.

**Tex., Sherman**—Plans being prepared grading surf. and building structures o n 5.54 mi. state hgwy.

**Tex., Greenville**—This city plans a $1,000,000 street improvement program.

**Tex., Waco**—Action taken by County Commrs. of Limestone County will result in securing Federal and State Aid to the extent of $90,000, providing for a good road from Waco to Mexia.

**Tex., Midlothian**—County Commr. L. O. Moore reported the sale of $65,000 road bonds for work on Dallas-Midlothian Road.

**Tex., Houston**—Liberty County will vote in January on a bond issue of $2,000,000 for the improvement of roads.

**Tex., Dallas**—Dallas County Commrs. Court authorized County Auditor to advertise for bids for construction of 4 roads to cost $1,509,381.

**Tex., Amarillo**—Potter County will receive about $9,000 for building asphalt roads into Amarillo. State and Federal aid for road building in various Panhandle counties totals $20,000.

**Tex., Brenham**—City sold street paving bonds of 40,000 and work will start soon .

**Tex., Dallas**—Bids on the construction of 2 miles East Pike will be asked by Commr. Jim Miller.

**Tex., Robstown**—City will vote on a bond issue of $80,000 to provide for paving and graveling about 15 blocks of city streets; also for installing a modern sewerage system and disposal plant. E. E. Sands, of Houston, Engr.

**Utah, Salt Lake**—Bids were rejected by W. A. Leatham, City Recorder, for construction of curb and gutter.

**Utah, Ogden**—Preliminary survey of a proposed route from Winder, Utah, south along the rim of Bryce Canyon to an intersection with proposed Panguitch-Kanab state highway has been completed by Preston Linford of the U. S. bureau of public roads. Definite action on proposed improvements will be taken in the near future.

**Va., Richmond**—Joint ownership and operation of a Portland cement plant to supply the needs of Virginia and surrounding state is recommended by the State Highway Commission.

**Wash., Yakima**—County Commrs. of Yakima County will soon award a contract for completion of a first class gravel surface on 2 1-2 miles Evergreen Highway.

**Wash., Walla Walla**—It is proposed to pave highway from Pendleton through Walla Walla to the Columbia County line, a total of 65 miles, to cost $250,000. Citizens will vote in January to match $125,000 Federal aid money.

**Wash., Seattle**—Council approved plans for grading and water mains on 39th Ave. N.

**Wash., Prosser**—Two new highway projects are soon to be constructed in the district tributary to Prosser, as follows: A bridge across the Yakima River near Gibbon and new road of 2 miles.

**Wash., Chehalis**—Lewis County Commissioners authorized an appropriation of $50,000 for paving Ocean Beach Highway, 4.5 miles west of Chehalis.

**Wis., Manitowoc**—Bids will soon be asked for street flusher, loader and truck. A. H. Zander, City Clerk.

**Wis., Green Bay**—Plans paving grading and curbing 1.1 mi. Elmore, Cass and Oakland Counties.

**Wis., Tomahawk**—Contemplate Spirit Falls Rd., $5,000.

**Wis., Merrill**—Contemplate Rd. const. $5,000. Will mature in Spring.

**Wis., Sheboyan**—(Revised) County board of Sheboyan county appropriated $70,000 for the purchase of road machinery for 1922, including two large graders and two gravel plant outfits. G. W. Ubbelohde, Sheboyan, Commissioner.

**Wis., Sheboyan**—County board of Sheboyan county appropriated $30,450 for county aid bridge work in 1922. G. W. Ubbelohde, Sheboyan, Commissioner.

**Wis., Sheboygan**—County board of Sheboyan appropriated $95,659.38 for gang maintenance work during 1922. G. W. Ubbelohde, Sheboyan, Commissioner.

**Wis., Sheboygan**—County board of Sheboygan county appropriated $37,-

261.74 for a state and county road construction program for 1922. G. W. Uebelohde, Sheboygan, Commissioner.

**Wisconsin**—Wisconsin Hy. Comm., Madison, Peshtigo-Marinette Rd., Federal Aid Project 259, Marinette Co., (a) 47,192 sq.yd. concrete surfacing, (b) 15,350 bbl. cement, from W. E. Ule, Stevens Point, (a) $1.52, (b) $2.50, etc., total $108,088; Brogan, Burns & Schaefer, Green Bay (a) $1.29, (b) $3, etc., total $109,714; Jorgenson Constr. Co., Denmark, (a) $1.54, (b) $2.54, etc., total $113,585.

**West Virginia**—State Rd. Comn., Charleston, to Keeley Constr. Co., Clarksburg, grading 5 mi. Morgantown-Pt. Marion Rd., Monongalia Co., etc., $48,999, grading and paving 2 mi. Ripley-Fairplain Rd., Jackson Co., 10,-27,800 lin.ft. clearing, 55,000 cu.yd. ex. 450 lin.ft. clearing, 13,230 cu.yd. excav., 3,723 cu.yd. plain conc. pave., etc., $62,-517, 4.5 mi. Huntington-Hodges Rd., Cabell and Wayne Counties, 9,400 lin. ft. clearing, 23,300 cu.yd. excav., 8,550 cu.yd. one course plain concrete pavement, etc., $129,852; to L. J. Chandler, Virginia, Va., grading 4 mi. Huntersville-Knapps Creek Rd., Pocahontas Co., $43,200 cu.yd. excav., etc.; $36,713, 4.6 mi. Dawdy Mountain Rd., Boone Co., 102,200 cu.yd. excav., 1,150 cu. yd. dry excav., etc., $71,034; to J. Carola, Ronceverte, grading 3 mi. road from end Project 77 to Clintonville Rd., Greenbrier Co., 22,200 cu.yd. excav., 140 cu.yd. dry ecxav., etc., $21,260; to Stringer & Springer, Moundsville, grading and paving 2 mi. Moundsville-Taylors Ridge Rr., Marshall Co., 10,350 lin.ft. clearing, 15,776 cu.yd. excav., 18,-400 sq.yd. waterbound macadam, etc., $42,001; to Souder Constr. Co., Woolworth Bldg., Lancaster, Pa., grading and paving 3.3 mi. road from Hancock, Md., to Berkerley Springs Rd., Morgan Co., 17,600 lin.ft. clearing, 15,000 cu.yd. excav., 4,550 cu.yd. one course concrete pavement, etc., $86,279; to M. N. Schilsely, Johnstown, Pa., grading 4.4 mi. road from Pendleton Co. to Panay Rd., Grant Co., 23,300 lin.ft. clearing, 42,000 cu.yd. excav., etc., $41,220; Cavin & Powers, Charleston, grading 3 mi. Grantsville-Arnoldsburg Rd., Calhoun Co., 15,800 lin.ft. clearing, 26,900 cu.yd. excav., etc., $43,826.

## BRIDGES

**Calif., San Francisco**—The War Dept. grnated San Francisco permission to build a bridge across San Francisco Bay south of Hunter's Point.

**Ia., Pocahontas**—Comrs. Pocahontas Co. plan 100 ft. steel truss span bridge, 18 ft. roadway, two 5 ft. sidewalks. $25,000. A. L. Thornton, Pocahontas, engr.

**N. J., Trenton**—Freeholders approved plans for the improvement of a bridge on the Cedar Grove Road near Princeton. Bids will be advertised for. Estimated cost, $2,300.

**North Carolina**—State Hy. Comn., Raleigh, rein-con. bridges and culverts on State Projects 639 and 653, Mecklenburg 405 East 4th Ave., Knoxville, Tenn., $30,325. Noted Nov. 17.

**North Carolina**—State Hy. Comn., Raleigh, rein-con. bridges and culverts on State Project 980, Macon and Swain Counties, from Southern Dray Co., Asheville, $28,803, W. T. Moore Concrete Products Co., Andrews $31,822, H. A. Brown, Asheville, $31,841, State Project 155, Martin and Pitt Counties, from P. R. Ashby, Tucker Bldg., Raleigh, $30,287, J. W. Gregory, Danville, Va $30,887, J. P. Dicus, Burgaw, $31,716. Noted Nov. 24 under "Streets and Roads."

**O., Kenmore**—Summit Co. (Akron) takes bids in summer 535 ft. concrete highway bridge, here. $250,000. G. F. Pfeiffer, Court House, engr.

**O., Shadesville**—Comrs. Franklin Co., (Columbus), 890 ft. steel bridge, 24 ft., to E. M. Scully, 1431 Eastwood Ave., Columbus, $135,000. Above contract does not include approaches, $60,000.

**O., Hamilton**—Specifications for the proposed conc. bridge at Cokeotto as part of the extension of North Third St., for which $390,000 in bonds will be issued, have been improved by Miami Conservancy District Board. Plans will be submitted by County Engr. Fred M. Hammerle to County Commissioners.

**Pa., Phila.**—For bridge on 5th St., From Connor & Ley, 3621 North 5th St., $91,300. Jackson & Co., 119 South 4th. $91,300. Jackson & Co., 119 South 4th St., $98,800, Keystone State Constr. Co., 210 South 13th St., $102,000; bridge on 49th St., rfom T. F. Reilly, 50th St. and City Line Ave., $92,363, O. B. S. Co., 5617 Kingessing Ave., $98,839; bridge over Phila. & Reading R.R., Poplar St., from C. G. Shaffer Co., 224 North 32nd St., $26,729, F. J. Baas, 201 North Broad St., $32,000, Jackson & Co., 119 South 4th St., $36,450.

**Pa., Phila.**—Delaware River Bridge Comn., Widener Bldg., opened bids Dec. 19, bridge over Delaware River between here and Camden, N. J., (1) additional, for excav. and concrete below cutting edge of Pier A, not below el. 85 ft. $500 cu.yd.); (2) additional for excav. and concrete below cutting edge of Pier B, not below el. 105 ft. (1,100 cu.yd.); etc., from Holbrook (1,100 cu.yd.); etc., from Holbrook, Cabot & Rollins Corp., 52 Vanderbilt Ave., New York, and Keystone State Constr. Co:. 210 South 13th St., (1) $13.50, (2) $20, etc., total $1,669,275; Foundation Co., 120 Liberty St., New York, (1) $65, (2) $75, total $1,843,750; Eyre & Johnson, Phila., (1) $48, (2) $68, total $1,943,744.

**Pa., Phila.**—F. H. Caven dir. pub. wks., opened bids Dec. 13, removing old w.i. truss spans and piers, and building bridge over Schuylkill River, South St., from Dravo Contg. Co., Real Estate Trust Bldg., $644,000; Keystone State Constr. Co. 210 South 13th St., $721,000; Snare Corp., 1524 Chestnut St., $872,000.

**Tex., La Grange**—Fayette Co. making plans 1,200 ft. bridge on Highway 3B, over Colorado River, here, to have 300 ft. steel center span, 13 0 ft. concrete arch spans. $302,500. A. Schlafli, Schulenburg, co. engr.

**Wisconsin**—County appropriations for bridge work during 1922, Adams Co. $3,000. J. A. McGregor, Friendship, comr.; Barron Co. $35,890. E. Geason, Barron, comr.; Buffalo Co. $54,182. J. Reinhardt, Nelson comr.; Chippewa Co. $36,383. P. O. Lokrantz, Chippewa Falls, comr.; Dane Co. $50,000. E. J. Smith, Madison, comr.; Eau Claire Co. $12,000. G. Osborne, Eau Claire, comr.; Grant Co. $47,275. H. Mink, Lancaster, comr.; Jefferson Co. $2,498. R. D. Royce, Ft. Atkinson, comr.; Pepin Co. $7,000. G. A. Goss, Durand, comr.; Pierce Co. $18,400. C. F. Kenall, Ellsworth, comr.; Kewaunee Co. $25,265. M. Shaw, Algoma, comr.; Walworth Co. $5,000. H. J. Peter, Elkhorn, comr.; Wood Co. $21,-888. E. Morris, Wisconsin Rapids, comr.; Monroe Co. $40,207. C. H. Millard, Sparta, comr.; Sauk Co. $38,041. E. H. Groth, Baraboo, comr.; Waukesha Co. $42,100. C. J. Hahn, Waukesha, comr.; Burnett Co. $21,600. G. E. Miller, Antigo, comr.; Brown Co. $25,000. G. J. Cormier, Green Bay, comr.; Calumet Co. $3,600. W. Hoenig, Chilton, comr.; Waupaca Co. $43,100. J. Huffcut, Waupaca, comr.; Waushara Co. $10,000. G. Grimm, Wautoma, comr.; Sawyer Co. $12,000. E. J. Collett, Hayward, comr.; Ashland Co. $12,057. W. E. Dillon, Highbridge, comr.

**Ont., Toronto**—Plans bridge over ravine on St. Claire Ave., probably steel. $712,000. R. C. Harris, City Hall, comr. pub. wks.

**Utah, Ogden**—Plans and specifications for construction of Riverdale overhead crossing over Union Pacific tracts south of Ogden are being completed under direction of State Bridge Engineer Eugene Bush. Bids will be asked soon. Entire structure, including viaduct, approaches and 2 steel spans of 135 ft. each estimated at $200,-000.

**Fla. Jacksonville**—J. A. Kidd, Jacksonville, Fla., awarded contract removing wooden bridge over Six Mile creek and construction new wooden bridge, 2,498.

**Pa. Philadelphia**—Keystone State Construction Co., Phil and Holbrook, Cabot and Rollins low bidders for construction two main piers Delaware River bridge, $1,669,275. Above firms will be awarded contract in two weeks.

**Florence, S. C.**—Contracts for the Pee Dee bridge project were let last night to Chitwood & Palmer for approaches, wooden bridges on causeway and roadway, etc., and to Hyde & Baxter for the construction of the steel bridge which will span the river. Contracts total $131,987.

**W. Va., Bluefield**—McClintic-Marshall Company, Pittsburgh, Pa., awarded contract to construct bridge on Princton-Spanishburg road, $7,600.

## MISCELLANEOUS

**Ia., Garner**—Christianson & Gustavson, Mason City, awarded contract for labor for construction D. D. No. 118, $2,463. Material to Humbolt Gravel & Tile Co. Humbolt, $3,790.

**Minn., Jackson**—Contracts awarded as follows: D. A. Lahart, Window, Minn., J. D., No. 65, $9,00; Wilson Bros., 609 Globe Bldg., Minneapolis, J. D., No. 76, open work, 9¼c per yard; Pete Thompson, Window Minn., Tile work, $106,765; D. A. Lahart, Window, Minn., J. D., No. 83, $9,440; Mathews Bros., Eriee, Ill., open work, 9 cents per cubic yard; Nielsen & Sorenson, Worthington, Minn., Tile work, $38,216.

**Va., Norfolk**—Fred E. Jones Dredging Co., Norflok, awarded contract dredging at Navy yard, 16 cents.

**Tex., Beaumont**—Howard Kenyon Dredging Co., Houston, & J. E. Brousard, awarded contract, $1,000,000, drainage project.

## SEWERAGE & SANITATION

**Fla., Dunedin**—For 11,700 ft. sanitary and storm sewers in Bway., Scotland, Virginia, Douglas, Lowden and Edgewater Sts., to J. G. Yeats, Port Tampa, $26,503. Noted Nov. 24 under Streets and Roads.

**Fla., West Palm Beach**—On December 27 vote will be taken on $100,000 bond issue for storm and sanitary sewers. K. D. Riddle, city engineer.

**Ga., Millen**—Lawrence Manning has prepared plans for extending sewer system for city. The mayor.

**Ill., Mt. Olive**—Bd. Local Impvts., sewers, to J. Keeley Co., Cahokia Bldg., East St. Louis, $82,400.

**Mo., Joplin**—For 3,500 ft. 8 in. tile sewers between Wall and Pearl Sts., from 23rd to 27th Sts. between Virginia and Pennsylvania Aves. from 23rd to 27th Sts., Harlem and Porter Aves. between B and C Sts., between Harlem and Porter Aves. from 19th to 26th Sts., to E and V. E. Koch, 2304 Pennsylvania Ave., $1.67-$1.72 per lin. ft.

**Ia., Clinton**—Resolution adopted by council will provide for the construction of sewers in District No. 6.

**Kans., Topeka**—Hariand C. Bartholomew, Topeka, city planner, recommends the improvement of the sewerage system of the city.

**Mo., St. Louis**—A bill will be submitted to Public Utilities Committee of the Board of Aldermen calling for the establishment of three incineration plants

**N. J. Harrison**—Passaic Valley Sewerage Comrs., 128 Market St., Newark, to Harrison & Craig, 31 Clinton St., Newark, southerly portion Sect. 28, Kearny-East Newark-Harrison Branch Intercepting Sewer, here, 3,110 lin.ft. earth excav. and refill in trench for 36 in. concrete sefer, $25.75 per lin.ft., 660 lin.ft. earth excav. and refill in trench for 15 in. vitr. sewer, $8.50, 1,560 cu.yd. concrete masonry, $14,50, etc., total, $129,863. Noted Nov. 17.

**N. Y., New York**—H. Bruckner, pres. Bronx Boro. Municipal Bldg., opened bids Dec. 12, sewers in East Tremont Ave., west side between Appleton and Coddington Aves., etc., from J. L. Sigretto & Co., $50,701; Clemente Contg. Co., 1195 Spofford St., $53,933. Noted Dec. 8.

**N. Y., New York**—H. H. Curran, pres. Manhattan Boro. Municipal Bldg., opened bids Dec. 12, altering and improving sewer in West 20th St., from J. Burns, 103 East 125th St., $18,355, P. J. Kearns Contg. Co., 2306 Creston Ave., $18,750 T. A. Reilly Co., 48 East 41st St., $21,315; repairing 15 in. vitr. sewer in East 101st St., from J. V. Timoney Co., 220 East 201st St., $2.425, Slatterly Eng. & Constr. Co., 10 East 43rd St., $3,225, P. J. Kearns Contg. Co., 2306 Creston Ave., $3,360. Noted Dec. 8.

**N. Y., Brooklyn**—E. Riegelman, boro. pres., Boro Hall, storm and sanitary sewers, to Tomasetti & Co., 1133 60th St., in Ave. S. 82.87% of engineers estimate ($28,000) in Fenimore St., etc., 88.98% ($3,000); to Murphy Bros., 8856 26th Ave., in 64th St., etc., 71.34% ($2,000). Noted Dec. 8.

**O., Akron**—Director Pub. Serv. 1,925 ft. 120 in. vitr. brick and 3,000 ft. 6-12 in. tile sewer in Willow Run Contr. 2, to W. Gibbons Constr. Co., Cleveland, $109,423. Noted Dec. 1. estimated to cost $180,000.

**Minn., Deer River**—Citizens are interested in a project for the construction o fa sewer system. Total cost es-

**Okla., Ramona** — Preliminary plans are being prepared for 3 mile sewerage system and disposal plant. Approximate cost $40,000. V. V. Long & Co., engineers.

**Pa., Ellwood City**—Construction of sewage disposal plant is planned. About $100,000. A. Main, 228 6th St., boro engineer.

**S. C., Marion**—On January 17, 1922, vote will be taken on $100,000 bond issue for extending sewer system, constructing white way, etc. The mayor.

## LIGHTING & POWER

**Ala., Birmingham**—Comrs. order 26 street lights installed.

**Ala., Montgomery** — The Houston Power Co. was granted permission to erect a dam and hydro-electric power plant on the Choctawhatchee River.

**Ark., Fayetteville**—Frank I. Wilcox, Contr. Engr., Chemical Bldg., St. Louis, Mo., has completed plans for a new steam power water plant, Westfork on White River

**Calif., Oroville**—City Trustees will call a bond election soon for the proposed municipal electrical distribution system.

**Calif., Quincy**—William Watson in charge of surveying crew will survey for power line for F. G. Gansner, owner of electric plant, Quincy, to connect with Great Western Power Co. at a point between Indian Falls and Paxton.

**Fla., San Juan**—Purchase of power planta of Orlando Water & Light Co., delayed by survey for streets and proposed bond issue to include all. $1,500,000.

**Fla., Crescent City**—Bonds voted for enlargement of municipal electric light plant and water works.

**Ind., Frankfort**—This city is to have a new electric light and power plant. Estimated cost $250,000, according to C. D. Lyon, consulting engineer, Cincinnati.

**Ia., Muscatine**—City Council will call special election for vote on bond issue of $250,000 for a municipal electric lighting plant.

**Md., Hagerstown** — Hagerstown & Frederick Ry. Co. consider the erection of a great power unit at the coal mine at Confluence, Pa.

**Mich., Lansing**—Council considers the installation of an ornamental lighting system on Ver Linden Ave. and Durant Factory St.

**Minn., St. Paul**—St. Paul Gas Light Co., ordered to extend its electrical lines.

**Nev., Reno** — An extension of the "White Way" lighting system in the business district and the addition of 27 more street lights in residence district was recommended to city council.

**Okla., Red Rock**—A campaign for an electric light plant has been started here.

**O., Toledo**—Work on the $1,500,00 power belt line to be installed by the Toledo-Edison Co. will start April 1, according to General Manager Fred Derge. Line will be approximately 28 miles in length.

**N. J., Trenton**—Ordinance passed requiring Trenton Street Railway maintain cable underground on Lincoln Ave.

**Northern France** — There being no water-power possibilities in the region, efforts are being directed toward the more economical employment of coal with a view to reducing power costs and permitting manufactured articles to be placed on the market at competing prices. Various coal-mining companies in the Department have constructed electric power plants driven by steam, utilizing the unsalable low-grade coal, washings, and slack at the pit mouth. Still others are in process of construction or are contemplated.

**Pa., Braddock**—City Council plans the installation of a municipal light plant.

**Pa., Hazelton** — The Pennsylvania Power & Light Co. will install a large number of lights in this city.

**Tex., Grosebec**—Plans light and sewerage system.

**Wis., Racine** — A privately owned plant is considered for Kenosha, according to W. A. Gross, chief engineer, Nash Motor Co., Kenosha.

**Wis., Madison**—The Peninsular Power Co., headquarters Commercial National Bank Bldg., Madison, will build a power house at Crystal Falls, Mich. Estimated cost, $60,000.

## WATER SUPPLY

**Calif., Placerville** — City Trustees voted in favor of the purchase of the high pressure system of the El Dorado Water Co. Thirty Thousand dollars in bonds was voted for water system improvement.

**Ga., Milledgeville**—City recently acquired water works, which are to be reconstructed. Installation of filtering system is contemplated. J. B. McCrary Engineering Co., engineer.

**Ia., Cedar Rapids**—To vote on $175,000 bonds for reservoir, 266 ft. diam., rein.-con. walls, flat slab roof. Hatton, Holmes & Anthony, 321 Masonic Temple, engrs. Noted Oct. 13.

**Ia., Clinton**—Clinton Water Co., 5th Ave. and 1st St., plans 1,000,000 gal. reservoir, elevated steel tank, 4 mi. mains, 2 mi. 24 in. pipe, new pumps, also auxiliary pumping station at Lyons, Ind. $100,000. W. L. Meeker, supt.

**Ind. Hammond**—J. Erickson, engr., 30 North LaSalle St., Chicago, soon receives bids 1 story, 50 x 5 ft. boiler house and 1 story, 65 x 95 ft. pumping station for city. $75,000. Wolf, Sexton, Harper & Trueax, 19 West Madison St., Chicago, archts.

**Ill., Des Plaines** — Bd Pub. Wks. making plans 6 in. c.i. mains and 10-12 in. vitr. tile sewers. $27,000. W. H. Allen, 122 South Michigan Ave., Chicago, engr.

**Kans., Topeka** — City Commission passed an ordinance providing for the issue of the remaining $95,000 waterworks improvement bonds.

**N. J. Trenton**—State Board of Public Utility Commrs. granted authority to Hackensack Water Co. to issue $2,000,000 bonds. The extension of the plant is contemplated.

**N. Y., Binghamton**—Request for a new and adequate water supply system at Broome County Farm was made by Supt. A. A. Lord.

**Miss., Belzoni** — Belzoni D. D. plans pumping plant for reclamation of 4,000 acres. C. E. Miller, Belzoni, engr.

**Mo., Mountain Grove** — Vote to be taken some time in January on $20,000 bond issue for improving water works plant and paving streets.

**O., Akron**—Plans addition to purification plant, $80,000; pumping station and buildings, $70,000: pipe line, $350,000. G. G. Dixon, 102 East Mill St., engr.

**Mo., Caruthersville** — City voted to issue $65,000 bonds for improving and enlarging water works.

**Mo., Portageville**—City will lay 6-inch cast iron mains, pumps, tank and tower at approximate cost of $40,000. A. C. Moore, Joplin, engineer.

**O. Cleveland**—Babcock & Wilxox Co., Guardian Bldg., awarded contract for 4 water tube boilers, $91,834.

**O. West Park**—Sewer & Water Imp. Co., 1350 West 89th St., Cleveland awarded contract for 41,000 ft. 6-8 in. c.c. mains.

**Okla., Romona** — City will expend $10,000 for water-works extensions. V. V. Long & Co., engineers, 1300 Colcord Bldg., Oklahoma City.

**S. C., Walhalla**—Voted $90,000 bonds for waterworks. J. Moss, chn. Pub. Wks. Engineer not selected.

**S. C., Johnston**—City will install water works, for which $65,000 will be issued. The Mayor.

**S. C., Kingstree** — Installation of water is planned. Lee, Pannell & Murray, 7½ Lorange Street, Sumter, S. C., engineers.

**Tex., Galveston**—H. L. Durland, consulting engineer, will prepare plans for the installation of an oil engine plant at Alta Loma. Bids will be advertised for. Approximate cost of plant, $117,000.

**Tex., Jacksonville** — Bonds to the amount of $150,000 for water works improvement were recently voted. T. E. Acker, Mayor.

**Va., Richmond**—Contracts awarded as follows: stand pipe and foundation to Pittsburgh-Des Moines Steel Co., Tuttle & South West 10th St., Des Moines, Ia., $12,350; e. i. pie to American Cast Iron Pipe Co., 176 Scarret Bldg., Kansas City, Mo., $2,400. Will call bids about Jan. 10th for filteration plant.

**Va., Richmond**—It is intended to extend water works and enlarge storage facilities. $1,500,000 bond issue approved.

**Va., South Boston**—Water and sewer systems to be improved and water mains constructed. The Mayor.

**Wyo., Greybull**—Council will call a special election to vote on water bonds.

**Wis., Stevens Point**—Feb. 8 to vote on $65,000 bonds, developing new source water supply, incl. sinking wells, pumping station, piping, etc. W. G. Kirchoffer, Vroman Blk., Madison, engineer.

**Ont., Ottawa**—The Board of Control recommended to the City Council the installation of water mains in the territory bounded by Holland Ave., the City Limits, Spencer St. and Scott St. The estimated cost of the work is $42,325.

**Ont., Hamilton** — Work upon the James Street reservoir has almost been completed, and wat er will likely be turned into the big tank this week. The concrete work has been finished and drainage system installed.

Sask., Yorkton—City officials consider a gravity water project estimated to cost $50,000 and an additional 550 horsepower unit for electric power house, estimated to cost $75,000.

## MISCELLANEOUS

**Calif., Los Angeles**—Board of Harbor Commrs. have taken steps toward the proposed $1,200,000 project which calls for the building of a terminal island on the east side of the main channel. Plans will be prepared by Harbor Engineer Vincent. Approximate cost $215,000.

**Calif., Los Angeles**—At a conference between State Highway Commission, United States Forestry Dept., and San Bernardino County Engrs. it was decided to proceed with the construction of Deep Creek cut off. Total cost estimated $205,000.

**Calif., Sacramento**—Improvements in Butte and Sutter Counties planned by Reclamation Dist. 2,054, will cost approximately $119,470.

**D .C., Washington**—Improvement of waterway inside the shore line between Chincoteague Bay, Va., and Lewes, Del., was recommended by army engineers. Dredging of a channel 6 ft. deep at mean low water and 40 to 50

## EQUIPMENT BARGAINS

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For your new road contract you will want pipe for your water service. Our used pipe, rethreaded and coupled, will answer your requirements the same as new pipe and will save you considerable money. We carry all sizes from ¾ to 12 inches, have large stock, 1, 1¼, 1½, 2, 2½, 3 and 4 inches.

**Marine Metal & Supply Co.**

167 South St., N. Y. City
137-147 Fifteenth St., Jersey City


**HELP WANTED**

**WANTED**—Civil Engineer and Superintendent of Streets, in New England town of 30,000. State age, education, experience, references and salary expected. Address Box 373, care Public Works, 243 W. 39th St., New York. (26-27)

ft. wide, estimated to cost $246,000.

**D. C., Washington**—An expenditure of approximately $43,000,000 for rivers and harbors in the fiscal year 1923 is recommended by Maj. Gen. Beach, chief of army engineers; $40,000 will be appropriated for the Chicago harbor and $20,000 for the Chicago river.

**La., New Orleans**—The Jefferson police jury created a new drainage district. Project known as Ames Municipal Dra. Dist. About $100,000 will be expended for construction of ditches and other improvements. Meyer Eiseman, pres.

**Mo., St. Joseph**—Commrs. contemplate the construction of a drainage ditch at Lake Contrary to cost $100,500 for excavating work, $20,000 for bridges and $10,000 for right of way.

**Md., Baltimore**—Plans as prepared by Edwin J. Clapp and Francis Lee Stuart, Engrs., for the Port Developement Commission call for the following: Development of piers, McComas St. property, on Mud Islands and flats adjacent to Hanover St. bridge, and on property of Arundel Corp.; acquisition of Mud Islands and flats and Arundel Corp.'s property; development of Hughes St. property as a terminal; turning over of harbor belt line to railroads; building outside belt line; reciprocal switching between Western Maryland and Baltimore & Ohio Railroads; establishing piers.

**Calif., Berklye**—A total of $1,014,500 was subscribed for building the memorial stadium at University of Calif. Frank H. Probert, Chairman of the Stadium Committee.

**Fla., Eustis**—City voted in favor of purchasing a fire-engine for the city, cost not to exceed $10,250.

**Ill., Granite City**—Citizens voted in favor of a bond issue of $30,000 to provide for equipment for fire dept.

**Nev., Reno**—The Seven Troughs Reorganized Mines Co., L. A. Friedman, Pres., plan the driving of a tunnel at a cost of about $200,000. John G. Huntington, of Reno, engineer for the company.

**N. Y., Utica**—City officials consider the installation of a new fire alarm system here.

**N. Y., Buffalo**—According to Frank J. Perkins, members of the City Council, Buffalo will sink test wells for natural gas on city property.

**Pa., Philadelphia**—Plans are being prepared for the reconstruction of Franklin Field for the University of Pa.

## OFFICIAL ADVERTISING

**HIGHWAY WORK**

**OFFICE OF STATE COMMISSION OF HIGHWAYS**

Sealed proposals will be received by the undersigned, at their office No. 55 Lancaster Street, Albany, N. Y., at one o'clock P. M. on TUESDAY, the 10th day of JANUARY, 1922, for the improvement of highways in the following counties:

ALBANY—One highway, 5.89.
ALLEGANY—One highway, 5.01.
DUTCHESS—One highway, 1.33
FRANKLIN—One highway, 7.50.
GENESEE—One highway, 2.10.
ORANGE—One highway, 2.75.
ORLEANS—One highway, 2.25.
SCHOHARIE—Two highways, 3.94 & 10.33
SULLIVAN—One highway, 5.69.

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the division engineers in whose division the roads are to be improved. The addresses o fthe division engineers and the counties in which they are in charge will be furnished upon reuest.

The especial attention of bidders is called to "General Information for Bidders" in the itemized proposal, specifications and contract agreement.

HERBERT S. SISSON,
Commissioner.

J. C. FINCH,
Secretary.

27-1

# TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

**STREETS AND ROADS**

**Ill., Cairo** 2 p. m., Jan. 16
For road work—Bd Co. Comrs.

**N. J., Bridgeton** 2 p. m., Jan. 10
For const. state hwy. route 6, Bd. Chosen Freeholders, Cumberland co.

**O., Celina** Jan. 10
For 6374 lin ft pipe guard rail, Leon C. Herrick, Dir. State Hwys.

**Okla., Idabel** 2 p. m., Jan 10
For sec A, B and C, Fed Aid Proj No. 40—Co. Clk.

**Okla., Sayre** Feb. 6
For paving, $125,000—W. E. Simmonds, City Clk.

**Va., Richmond** noon, Jan. 5
For const. St. Proj. Nos. 154, S-164—G. P. Coleman, St Hwy Comr.

**SEWERAGE**

**S. D., Madison** 8 p. m., Jan. 23
For const. sanitary sewers—Wm. Rae, City Aud.

**WATER SUPPLY**

**Minn., Duluth** 11 a. m., Jan20
For centrifugal pump unit—F. D. Ash, City Clk.

**Minn., St. Paul** 11.30 a. m., Jan. 9
For cast iron gate valve and service connection boxes—H. W. Austin, Purchasing Agt.

**LIGHTING AND POWER**

**Minn., St. Paul** 11.30 a. m., Jan. 9
For electrical energy for pumping station—H. W. Austin, Purchasing Agt.

**BRIDGES**

**Kans., Lyons** noon, Jan 23
For const 2 bridges—Sam Ainesworth, Co. Engr.

**W. Va., Charleston** Jan. 15
For bridge to cost about $40,000 in Hartland—C. P. Fartney, St. Rd. Comr.

**MISCELLANEOUS**

**D. C. Washington** 10:30 a.m., Jan. 11
For meters, meter-sealing wires and rotating meter-testing standards,—Gen. Purchasing Officer, Panama Canal Washington.

**Nebr., Omaha** noon Jan. 10
For ditch checks for co. during 1922, —Frank Dewey, Co. Aud.

**Tex., Dallas** 10 a.m. Jan. 4
For automobile for police and fire signal depts.,—M. G James, City Secr'y

**STREETS AND ROADS**

**Ind., Veray**—Culberstone Bras Veray awarded contr for constr Hgwy.

**Ind., Shoals**—Wm. Patterson, Loogootee awarded contr for Hgwy in Perry Trop.

**Ind., South Bend**—White Constr Co., 10 Merchants Co., awarded contr for widening street.

**Ia., Des Moines**—Wright Constr Co., 211 Flynn Bldg awarded contr for paving.

**Ia., Ames**—W. M. Walkmus, Livermore Ia. awarded contr for graveling.

**Kans., Atchison**—E. P. Olson S. V. Joseph Mo. awarded contr for Fed and Rd—work $31,175.

**Md., Baltimore**—Baltimore Block & File Co. 320 N. Monroe St. awarded contr paving various streets.

**Minn., Blue Earth**—Meixner & Arndt awarded contr for curbing.

**Minn., Hibbuig**—A. Gurhrie & Co., 366 Jackson St., S. V. Paul awarded contr for grading.


**Make Your Own Sewer Pipe**

and give local men work. You can keep practically all the money at home. Write for particulars.

**Independent Concrete Pipe Co.**

Indianapolis, Indiana

**Loper Fire Alarm Company**

STONINGTON, CONN.

Manufacturers of COMPRESSED AIR FIRE WHISTLES, WHISTLE BLOWERS, BELL STRIKERS, BOXES, GONGS, Etc., Etc.

Estimates Cheerfully Given

**Mo., Kirksville**—James G. Reed awarded contr for sidewalk. Const. start in Spring.

**Nebr., Paunee City**—American Paving Corp. Omaha, awarded contr for paving and sewers $102,152.

**N. C., Raleigh**—Parters & Boyd, Charlote N. C., awarded contr for road improvement in Wilkes Co.

**O., Cashactan**—Henderson Bros. awarded contr for road grading.

**O., Alliance**—C. S. Biery, Alliance & J. C. Devline Co. Alliance awarded contr for paving and sewer constr.

**O., North College Hill**—Alzert Krass Mt. Healthy O. awarded contr for macadam grad and drain.

**Pa., Minersville**—Jos. Newcomb, Spring St. Pittstone, Pa. awarded contr for paving street. $43,500.

**W. Va., Charleston**—Andy Nicholich, Fairmont W. Va., awarded contr for road grading.

**W. Va., Fairmont**—F. Y. Harnor Clarksberg, W. Va. awarded contr for road grading.

**Charleston, W. Va.**—State Highway comr., Clarkston, Court House, let contr. ofr rd. imp. in Mongalia, W. Va., to Keeley Constr. Co., Clarksburg, W. Va. W. S. Downs, div. engr., Morgantown, W. Va. Major Fortney, engr., Charleston, R. Palmer, county engr., Court House, Fairmont, & rd. in Marshall county to Springer & Springer, Moundsville, W. Va., & rd. in Boone county to L. J. Chandelr, Virgliina, Va., & rd. in Jackson county to Keeley Constr. Co., Clarksburg & rd. in Greenbrier county to Joe Carola, Ronceverte, W. Va., & rd in Cabell & Wayne county to Keeley Constr. Co., rd. in Calhoun county to Powers, Charleston, Morgan county to Souder Constr., Lancaster, Pa.

## SEWERAGE AND SANITATION

**Ind., Richmond**—John H. Hipskind awarded contr for constr sewer.

**Ind., Noblesville**—Nappanee Const. Co. Nappanee Ind. awarded contr for drain.

**Ind., Des Moines**—G. G. Herrick, 704 Observatory bldg. awarded contr for sewer.

**Kans., Augusta**—Smith — Graham Const. Co. Augusta Kans. awarded contr constr. sewers. $22,407.

**Mo., Columbia**—C. J. McCoy Const. Co. Emporia Kan. awarded contr for sewarge disposal plant and san. sewer.

**N. J., Passaic**—S. Guardalibeni Passaic St. Lode N. J. awarded contr for sau. sewer.

**O., Akron**—E. L. Brueggeman Akron awarded contr for sewer constr in Summit Co.

**O. Akron**—Walter P. Gibbons Cmtrg. Co. 343 Superior Arcade Cleveland awarded contr for trunk sewer $170,000.

**O., Wadsworth**—Abernathy, 1379 Grant St. Akron awarded contr for sewer in Grandrun Ave.

## WATER SUPPLY

**Mich., Oakwood**—Oakwood Const. Co. 165 Ford blvd. awarded contr for water maine extension $20,000.

**N. J., Gloucester**—Hearner & Guthridge Norristown Pa. awarded contr for water works and pumping stations. $200,000.

**O. Cleveland**—Otomar Stange & Jack Welch, St Clark & Cleveland O. awarded contr for reservoir.

**Okla., Broken Bow**—Ladd Constr Co. 716 Ccarritt bldg. Kansas City Mo. awarded contr for water works and sewers.

## BRIDGES

**Ill., Springfield**—D. W. Carnine Sullivan Ill. awarded contr constr Nortle Rd. bridge. $18,738.

**Pa., New Castle**—Minter & Anderson New Wilmington awarded contr for hgwy bridge,$550,000.

**Pa., Philadelphia**—T. F. Reilly, 50th and City Aves. awarded contr for foot and trolley bridges.

**Va. Richmond**—Roanoke Iron Bridge Works Inc. Roanoke awarded contr for bridge over Dry Creek on S. V. Rd No. 10.

**W. Va., Sutton**—Oregonia Bridge Co. Lebanon O. awarded contr for constr bridge, $225,000.

**W. Va., Clay**—Oregonia Bridge Co. Lebanon O. awarded contr for constr bridge,$25,000.

## WORK CONTEMPLATED

**Ill., East Moline**—Plans being prepared for paving in 7th St. to mature in Spring. Roy E. Sneary Engr.

**Ill., Napesville**—Plans prepared for street improvement to mature in Spring. C. A. Ashley Engr.

**Ill., Cairo**—Bids call for about Jan. 15 for road work.

**Ill., Hinsdale**—Plans prepared for paving and reinfacing, $45,000.

**Ia., Cherokee Co.**—Sate Hgwy Amer. contemplates road work.

**Ia., Spencer Co.**—Conrs contemplate graveling rd in Clay Co. W. C. Mc Cown Engr.

**Ia., Storm Lake Co.**—Cnurs contemplate graveling Rd in Beuna Vista Co. will mature 1923.

**Ia., Spirit Lake Co.**—Cover contemplates paving in Dukinsor Co. R. A. Furmane Engr.

**Ind., La Parte**—Plans prepared for paving Ind. Rushville—Calling bids for highway work in Walker Twp.

## STREETS AND ROADS

**Ind., English**—Plans prepared for highway in Whiskey Rum Twp.

**Ind., Corydon**—Plans prepared for Pitmaud Rd in Harrison Co. Ind. also Rumley & Roudenbush Rd.

**Ind., Rockville**—Plans prepared for highway to sost $12,000 in Penn Twp.

**Ind., Newpart**—Plans prepared for constr hgwy in Vermullen Twp.

**Ind., Lebanon**—Bd. Covers contemplate constr hgwy $10,800.

**Ind., Petersberg**—Plans prepared for constr hgwy in Logan Twp.

**Ind., Evansville**—Plans prepared for constr Hgwy. $21,935.

**Ind., Andola**—Plans prepared for constr rd. Will call bids about Feb. 1.

**Ky., Frankfort**—Contemplate constr Rd in Montgomery Co.

**Kans., Fort Scott**—Plans prepared for constr 2.26 mi bit macadam and 3.16 mi bit macadam 16 ft wide.

**Md., Baltimore**—City Counsil contemplates proving various alleys $30, 000 and repairing streets $1,285.

**Mass., Franklin**—City contemplates paving $12,000.

**Mich. Benton Harbor**—Plans submitted for proposed boulevard system and bridge connecting with St. Joseph.

**Mo. Kansas City**—Plans prepared for grading Elmwood Ave. and establishing grade.

**Mont., Broadus**—Bids being called for Powder River Co. Rd bonds until Feb. 8.

**N. J., Milwood Crest**—Plans being prepared to constr sidewalk and curbs in Atlantic Ave.

**N. J., Bridgeton**—Plans being prepared for road paving in Cumberland Co. $350,000.

**N. J., Millville**—City contemplates street paving and sewer constr. $15, 000. N. R. Wade, Engr.

**O. Columbus**—Co. Contemplates road imp. in Darke Co. W. S. Townsend Engr., Greenville.

**O., Athens**—Will call bids in February or grading, paving an dcurbing, $5,000. C. C. Bibbee, Engr.

**O., Dayton**—Co. Covers contemplate street improvement. P. S. Bookwalter, Engr.

**O., Painesville**—City Council contemplates street improvement for next Spring.

**O., Greenville**—City Council contemplates street improvement.

**O., Ubana**—Plans being prepared to constr hard surf. rd.

**O., Springfield**—Resolution passed to proceed with paving program, $261, 768 for this Spring.

**O., Elyria**—Co. Covers Loraine Co. consider constr of boulevard to parallel Lake Shore tracks. 32 ft. wide bridge will span Sheffield ditch.

**O., Canton**—Petition submitted to repair Cleveland Ave.

**O., Wapakoneta**—State Hgwy dept. appropriated $110,000 State Aid and approved co program for six miles of rd.

**O., Cleveland**—Co. Engr. will inspect roads for paving.

**O., Tiffue**—Delegation of Co. farmers petition Co. Covers to permit paving contracts not to exceed $20,000 which will eliminate brick road constr.

**O., Celina**—State support asured for Celina—Watash Rd $93,000, Wane Hgwy $30,000 and reservoirs Rd $10, 000.

**O., Columbia**—State Hgwy Dept will pave Unity—Petersberg Rd $70,000 brick, 18 in. 1.34 mi.

**Pa., Wilkinsberg**—Boro Council contemplates grading, paving and grading and curbing.

**Pa., Uniontown**—Co Covers contemplates road inmprovement.

**Pa., Scranton**—Plans being prepared for street paving, $24,637. W. C. S. Schunke, Engr.

**W. Va., Fairmount**—City contemplates street paving various streets.

**W. Va., Moundsville**—Bids being called for road improvement.

**W. Va., Bridgeport**—Town Co. contemplate street paving, $37,000.

**Wis., Hartford**—City Council selected Jerry Donahue, Engr. 608 W. 8th St. Shedoygan for paving.

**Wis., Mayville**—Plans being prepared for paving in German St.

## SEWERAGE AND SANITATION

**Ia., Esterville**—Co contemplates drains No. 152, 154, 150 and 151.

**Ia., Emmetsberg**—Polo Alto Co. contemplates constr drains.

**Ia., Spencer**—Plans prepared for drain No. 46 and 86.

**Ill., Downers Grove**—Plans being prepared for constr sewer in Spring.

**Ill., Chicago Heights**—Plans being prepared for sanitary sewers, $68,000.

**Ill., Naperville**—Bd of local imp contemplate sewers and drain constr.

**Ill., Beardstone**—Plans prepared for drainage and power plants, $175,000.

**Minn., Dear River**—Plans being prepared for sewer systems.

**O., Athens**—City contemplates storm sewer, $30,000.

**Wis., Milwaukee**—Preliminary plans for intercepting sewers being made.

**Wis. Kenosha**—Bids being called for sewer const.

**Wis., Marshfield**—Plans being for sewers in various streets. Will call bids soon.

**Wis., Appleton**—Bids being called early in January for const sewers.

**Wis., Brillion**—Plans being prepared for sanitary sewer and water works.

## WATER SUPPLY

**Ill., Hinsdale**—Plans prepared for water mains, $75,000. Will mature Jan. Endwine Engr., 2047 Ogden Ave. Chicago.

**Ill., River Forest**—Plans prepared for water mains. R. F. Williams, Engr.

**Ill., Naperville**—Contemplate private water system at Country Club. $30,000.

**Minn., Cloquet**—Plans being completed for 2 reservoir covers. $$10,000.

**O., Milan**—Plans being prepared for water supply reservoir to cost $25,000.

**O. Newark**—City contemplates water filterature plant, $225,000.

**Pa., Ebensburg**—Na plans started for reservoir. Will mature in Spring.

**Va., Yorktown**—Plans prepared for reservoir for U. S. Govt.

# BUYERS' CLASSIFIED DIRECTORY

of Names of Firms from Whom to Buy Material, Appliances and Machinery Needed by Public Works Departments and Contractors

**CONTRACTORS' EQUIPMENT**
(See Paving Machinery also)
**Aerial Tramways**
Leschen & Sons Rope Co.
**Asphalt Block Press**
Nat'l Moulding Press Corp.
**Air Compressors**
Sullivan Mchy. Co.
**Ash Handling Mach.**
Blaw-Knox Co.
**Asphalt Block Press**
Nat'l Moulding Press Corp.
**Backfillers**
Pawling&Harnischfeger Co.
**Barges**
American Bridge Co.
**Belting**
Goodyear Tire & Rubber Co.
**Blasting Powder**
Du Pont de Nemours Co.
**Braces, Trench**
The Duff Mfg. Co.
**Bridges**
American Bridge Co.
Blaw-Knox Co.
Russell Grader Mfg. Co.
**Bridge & Wharf Timbers (Creosoted)**
Wyckoff Pipe&Creo.Co.,Inc.
**Buckets, Automatic & Dumping**
Blaw-Knox Co.
**Buckets, Clam Shell, Dragline, Orange Peel**
Blaw-Knox Co.
Osgood Co.
Russell Grader Mfg. Co.
**Cableways**
Flory Mfg. Co.
**Cars, Dumping and Industrial**
Good Rds. Mchy. Co., Inc.
Koppel Industrial Car & Equipment Co.
**Carts, Concrete**
Acme Road Mchy. Co.
**Castings**
American Bridge Co.
South Bend Foundry Co.
U. S. Cast Iron Pipe & Foundry Co.
**Caterpillar Tractors**
Holt Mfg. Co., Inc.
**Chutes, Coal**
U. S. Cast Iron Pipe & Foundry Co.
**Conduits (Creosoted)**
Wyckoff Pipe&Creo.Co.,Inc.
**Cranes, Locomotive**
Orton & Steinbrenner
Osgood Co.
**Cranes and Hoists**
S. Flory Mfg. Co.
**Cross-Arms (Creosoted)**
Wyckoff Pipe&Creo.Co.,Inc.
**Cross-Ties (Creosoted)**
Wyckoff Pipe&Creo.Co.,Inc.
**Crushers**
Acme Road Mchy. Co.
Good Rds. Mchy. Co., Inc.
Gruendler Patent Crusher & Pulverizer Co.
**Derricks**
American Bridge Co.
**Dinkeys**
Koppel Industrial Car & Equipment Co.
**Ditchers and Graders**
Osgood Co.
Russell Grader Mfg. Co.
**Dredges**
Osgood Co.
**Drills**
Sullivan Mchy. Co.
**Dump Bodies, Steel**
Heil Co., The
Jennings Automatic Dump Body, Inc.
Mandt Body Co.
**Dump Wagons**
Acme Road Mach. Co.
Austin-Western Road Mchy. Co.
Good Rds. Mchy Co., Inc.
Heil Co., The
Russell Grader Mfg. Co.
Standard Steel Wks.
**Engines**
Flory Mfg. Co.
Tiffin Wagon Co.
**Excavators**
Blaw-Knox Co.
Osgood Co.
Pawling&Harnischfeger Co.
Thew Shovel Co.
**Explosives**
E. I. du Pont de Nemours & Co.
**Heaters, Asphalt & Tar**
Connery & Co., Inc.
Honhorst, Jos., Co.
**HOISTS**
S. Flory Mfg. Co.
**Hose**
Goodyear Tire & Rubber Co.
**Jacks, Lifting**
The Duff Mfg. Co.
**Kettles, Asphalt & Tar**
Connery & Co., Inc.
Honhorst, Jos., Co.
**Lumber (Creosoted)**
Wyckoff Pipe&Creo.Co.,Inc.
**Mixers**
Acme Road Mchy. Co.
Blaw-Knox Co.
Jaeger Mch. Co.
Servicised Products Co.
**Motor Trucks**
Tiffin Wagon Co.
**Packing**
Goodyear Tire & Rubber Co.
**Paint**
Dixon Crucible Co., Jos.
Servicised Products Co.
**Piles (Creosoted)**
Wyckoff Pipe&Creo.Co.,Inc.
**Plows**
Russell Grader Mfg. Co.
Wiard Plow Co.
**Poles (Creosoted)**
Wyckoff Pipe&Creo.Co.,Inc.
**Pumps**
Acme Road Mchy. Co.
Chippewa Pump Co.
Emerson Pump & Valve Co.
**Snow Removal Outfits**
Holt Mfg. Co., Inc.
Russell Grader Mfg. Co.
**Steam Shovels**
Osgood Co.
**Structural Steel**
American Bridge Co.
**Switches**
Koppel Industrial Car & Equipment Co.
**Tires**
Goodyear Tire & Rubber Co.
**Track**
Koppel Industrial Car & Equipment Co.
**Trailers**
Servicised Products Co.
Smith & Sons Mfg. Co.
**Turn Buckles**
American Bridge Co.
**Trucks, Commercial**
Ward La France Truck Co.
**Turn Tables**
American Bridge Co.
**Wire Rope**
Leschen & Sons Rope Co.
**DANGER SIGNALS**
Ingram-Richardson Mfg. Co
**FIRE DEPARTMENT EQUIPMENT**
**Combination Chemical & Hose Wagons**
American-La France Fire Engine Co.
**Fire Alarm System**
Loper Fire Alarm Co.
**Fire and Chemical Hose**
Goodyear Tire & Rubber Co.
**Pumping Engines, Gasoline**
American-La France Fire Eng. Co.
**Pumps**
Chippewa Pump Co.
**Tires**
Goodyear Tire & Rubber Co.
**Triple Combination Motor**
American-La France Fire Engine Co.
**PAVING AND ROAD MACHINERY**
**Asphalt Block Press**
Nat'l Moulding Press Corp.
**Asphalt Plants**
Cummer & Son Co.
Hetherington & Berner
Warren Bros. Co.
**Car Unloaders**
Acme Road Mchy. Co.
Good Rds. Mchy. Co., Inc.
**Concrete Mixers**
Acme Road Mchy. Co.
Erie Mch. Shops
Good Rds. Mchy. Co., Inc.
Jaeger Mch. Co., The
Servicised Products Co.
**Gravel Screening Plants and Loaders**
Galion Iron Wks.&Mfg. Co.
Russell Grader Mfg. Co.
**Heaters**
Honhorst, Jos., Co.
**Oil Distributors & Sprayers**
Acme Road Mach. Co.
Austin-Western Road Machinery Co.
Connery & Co., Inc.
Goods Rds. Mchy. Co., Inc.
The Kinney Mfg. Co.
**Oil Hose**
Goodyear Tire & Rubber Co.
**Pumps—Oil and Asphalt**
The Kinney Mfg. Co.
**Road Graders**
Acme Road Mchy. Co.
Austin Western Rd. Mchy. Co.
Goods Rds. Mchy. Co., Inc.
Russell Grader Mfg. Co.
Stockland Road Mach. Co.
**Road Drags**
Acme Road Mchy. Co.
Austin-Western Road Machinery Co.
Good Rds. Mchy. Co., Inc.
Russell Grader Mfg. Co.
Stockland Road Mach. Co.
**Road Levellers**
Holt Mfg. Co., Inc.
**Road Maintainers**
Austin-&Western Road Machinery Co.
Russell Grader Mfg. Co.
The Baker Mfg. Co.
**Road Rollers**
Acme Road Mchy. Co.
Austin-Western Road Machinery Co.
Buffalo-Springfield Rol. Co.
Erie Mch. Shops
Good Rds. Mchy. Co., Inc.
Huber Mfg. Co.
**Rock Crushers**
Acme Road Mchy. Co.
Austin-Western Road Machinery Co.
Good Rds. Mchy. Co., Inc.
**Rock Drills**
Sullivan Mchy. Co.
**Motor Tandam Rollers**
Austin-Western Road Machinery Co.
Erie Mach. Shops
**Scarifiers**
Acme Road Mchy. Co.
Austin-Western Road Machinery Co.
Buffalo-Springfield Rol. Co.
Good Rds. Mchy. Co., Inc.
Holt Mfg. Co., Inc.
Huber Mfg. Co.
Russell Grader Mfg. Co.
Stockland Road Mach. Co.
**Scrapers**
Acme Road Mchy. Co.
Austin-Western Road Machinery Co.
Good Rds. Mchy. Co., Inc.
Root Spring Scraper Co.
Russel Grader Mfg. Co.
Smith & Sons Mfg. Co.
**Screens**
Acme Road Mach. Co.
Good Rds. Mchy. Co., Inc.
Russell Grader Mfg. Co.
**Spreaders**
Acme Road Mach. Co.
**Tar Kettles, Asphalt Heaters, etc.**
Acme Road Mchy. Co.
Connery & Co., Inc.
Honhorst, Jos. Co.
The Kinney Mfg. Co.
Standard Steel Works
Warren Bros. Co.
**Steel Forms**
Heltzel Steel Form & Iron Works.
Standard Steel Works
**Tractors**
Holt Mfg. Co., Inc.
Huber Mfg. Co.
**PAVING MATERIALS**
**Asphalt**
Servicised Products Co.
Standard Oil Co.
Texas Co.
**Binders**
Barrett Co., The
Standard Oil Co.
Texas Co.
**Bituminous Pavements**
Barrett Co., The
Texas Co.
Warren Bros. Co.
Willite Road Const. Co. Inc
**Creosoted Wood Block**
Wyckoff Pipe&Creo.Co.,Inc.
**Expansion Joints**
Barrett Co., The
Servicised Products Co.
Truscon Steel Co.
**Oil**
Barrett Co., The
Headley Good Roads Co.
Republic Creosoting Co.
Standard Oil Co.
Texas Co.
**Paving Brick**
Delaware Clay Prod. Co.
**SEWERAGE**
**Culverts**
Delaware Clay Prod. Co.
National Concrete Materials Co.
Newport Culvert Co., The
Russell Grader Mfg. Co.
The Robinson Clay Prod
**Drain Tile**
Robinson Clay Prod. Co.
**Pipe (Cast Iron)**
Nat'l Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdry Co.
Warren Fdry. & Mach. Co.
**Pipe Cleaning Machines**
W. H. Stewart.
**Pipe (Reinfr. Concrete)**
Independent Concrete Pipe Co.
**Segment Block Sewer**
Robinson Clay Prod. Co.
**Sewage Disposal Plants**
C. P. Landreth
Sanitation Corporation
**Sewage Disinfection**
Electro Bleaching Gas Co.
**Rods**
The F. Bissell Co.
W. H. Stewart
**Vitrified Fire Clay Sewer Tiles**
East Ohio Sewer Pipe Co.
Delaware Clay Prod. Co.
Robinson Clay Prod. Co.
**Vitrified Sewer Pipe**
Delaware Clay Prod. Co.
Robinson Clay Prod. Co.
**STREET CLEANING AND REFUSE DISPOSAL**
**Carts**
Acme Road Mchy. Co.
Tiffin Wagon Co.
**Garbage Bodies, Steel**
Heil Co., The
**Manholes—Catch Basins**
Wm. E. Dee Co.
South Bend Foundry Co.
**Incinerators**
Stacy-Bates Co.
**Sprinkling Wagons & Flushers**
Austin-Western Road Machinery Co.
Good Rds. Mchy. Co., Inc.
The Kinney Mfg. Co.
Tiffin Wagon Co.
**Street Flushing Hose**
Goodyear Tire & Rubber Co.
**Street Sweepers**
Austin-Western Road Machinery Co.
Ohio Municipal Equip. Co.
**STREET SIGNS**
Ingram-Richardson Co.
**WATER WORKS**
**Air Compressors**
Sullivan Machy. Co.
Sullivan Machy. Co.
**Air Lift Pumps**
**Brass Water Connection**
Mueller, H., Mfg. Co.
**Belting**
Goodyear Tire & Rubber Co.
**Chloride of Lime**
Penn Salt Mfg. Co.
Servicised Product Co.
**Chlorine Liquid**
Electro Bleaching Gas. Co.
**Deep Well Pumps**
Chippewa Pump Co.
Cook, A. D.
Layne & Bowler Co.
**Disinfecting Chemicals**
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# INDEX TO ADVERTISEMENTS


| A | Page |
|---|---|
| Acme Road Machinery Co. | 4 |
| Alvord & Burdick | 21 |
| American Appraisal Co. | 21 |
| American Bridge Co. | 23 |
| American Cement Machine Co., Inc. | — |
| American-La France Fire Engine Co. | 5 |
| American Tel. & Tel. Co. | — |
| Austin-Western Road Machinery Co. | 2 |

| B | |
|---|---|
| Badger Meter Mfg. Co. | 8 |
| Barrett Co., The | — |
| Bissell Company, F. | — |
| Black & Veatch | 21 |
| Blaw-Knox Co. | — |
| Brossman, Chas. | 21 |
| Buffalo Springfield Roller Co. | — |
| Burns & McDonnell | 21 |

| C | |
|---|---|
| Caird, James M. | 21 |
| Chippewa Pump Co. | — |
| Clark, H. W. Co. | 22 |
| Coldwell-Wilcox Co. | 7 |
| Collins, J. L. | 21 |
| Connery & Co., Inc. | 8 |
| Cook, A. D. | — |
| Cummer & Son Co., F. D. | 22 |

| D | |
|---|---|
| Dee, Wm. E. Co. | 6 |
| Delaware Clay Products Co., The | 5 |
| Dow & Smith | 21 |
| Duff Mfg. Co., The | — |
| Du Pont de Nemours Co., E. I. | 24 |

| E | |
|---|---|
| East Ohio Sewer Pipe Co. | 19 |
| Electro Bleaching Gas Co. | 7 |
| Elgin Sales Corp. | — |
| Emerson Pump & Valve Co. | 6 |
| Erie Mach. Shops | 5 |

| F | |
|---|---|
| Flory Mfg. Co., S. | — |
| Ford Meter Box Co. | 7 |
| Frazier, Ellms-Sheal Co. | 21 |

| G | |
|---|---|
| Galion Iron Works & Mfg. Co. | — |
| Good Roads Machinery Co. | — |
| Goodyear Tire & Rubber Co. | — |
| Gruendler Patent Crusher & Pulverizer Co. | — |

| H | |
|---|---|
| Hansen, A. E. | 21 |
| Hazen, Whipple & Fuller | 21 |
| Headley Good Roads Co. | 4 |
| Heil Company | — |
| Heltzel Steel Form & Iron Co. | — |
| Hetherington & Berner | 5 |
| Hersey Mfg. Co. | 8 |
| Hill & Ferguson | 21 |
| Holt Mfg. Co., Inc. | — |
| Honhorst Co., The Jos | — |
| Hotel Continental | 7 |
| Huber Mfg. Co. | — |

| I | |
|---|---|
| Independent Concrete Pipe Co. | 17 |
| Ingram-Richardson Mfg. Co. | 4 |

| J | |
|---|---|
| Jaeger Mach. Co. | 8 |
| Jennings Automatic Dump Body Inc. | — |

| K | Page |
|---|---|
| Kinney Mfg. Co. | 5 |
| Koppel Industrial Car & Equipment Co. | 4 |

| L | |
|---|---|
| Landreth, C. P. | 22 |
| Layne & Bowler Co. | 23 |
| Leschen & Sons Rope Co., A. | 4 |
| Loper Fire Alarm Co. | 17 |

| M | |
|---|---|
| Marine Metal & Supply Co. | 17 |
| McWane, R. C. | — |
| Mueller Mfg. Co. | — |

| N | |
|---|---|
| Nat'l Cast Iron Pipe Co. | 6 |
| Nat'l Concrete Materials Co. | — |
| Nat'l Moulding Press Corp. | — |
| Nat'l Water Main Cleaning Co. | — |
| Newport Culvert Co. | — |
| New York Continental Jewel Filtration Co. | 6 |
| Norwood Engineering Co. | 7 |

| O | |
|---|---|
| Ohio Municipal Equipment Co. | 7 |
| Orton & Steinbrenner Co. | 4 |
| Osgood Co., | — |

| P | |
|---|---|
| Pawling & Harnischfeger Co. | — |
| Penn. Salt Mfg. Co. | — |
| Pittsburgh Meter Co. | 17 |
| Pollock, Clarence D. | 21 |
| Potter, Alexander | 21 |

| R | Page |
|---|---|
| Republic Creosoting Co. | — |
| Robinson Clay Product Co. | 6 |
| Root Spring Scraper Co. | — |
| Russell Grader Mfg. Co. | 23 |

| S | |
|---|---|
| Sanitation Corporation | 8 |
| Servicised Products Co. | 13 |
| Skinner, Frank W. | 21 |
| Smith, A. P., Mfg. Co., The | 7 |
| Smith & Sons Mfg. Co. | — |
| South Bend Foundry Co. | — |
| Stacy-Bates Co. | 22 |
| Standard Oil Co. (N. Y.) | 3 |
| Standard Steel Works | — |
| Sterling Eng. Co. | — |
| Stewart, W. H. | — |
| Stockland Road Machy. Co. | — |
| Sullivan Mach. Co. | — |

| T | |
|---|---|
| Texas Co. | — |
| Thew Shovel Co. | — |
| Thomson Meter Co. | 6 |
| Tiffin Wagon Co. | — |

| U | |
|---|---|
| Union Water Meter Co. | 7 |
| U. S. Cast Iron Pipe & Fdy. Co. | 7 |
| Universal Road Mach. Co. | — |

| W | |
|---|---|
| Ward LaFrance Truck Corp. | — |
| Warren Bros. Co. | 2 |
| Warren Fdy. & Machy. Co. | 7 |
| Wiard Plow Co. | — |
| Wyckoff Pipe and Creo. Co., Inc. | 4 |
| Wyckoff & Son Co., A. | — |



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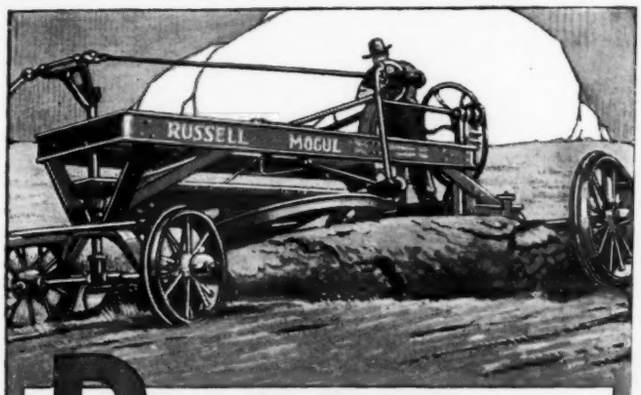


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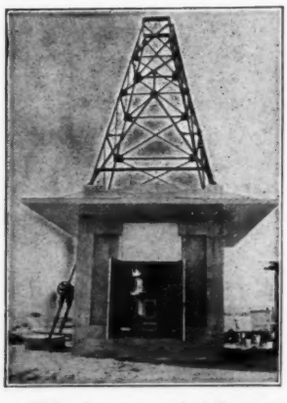

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